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JAN. 3, 1955

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NEWS DIGEST



French Ramjet Claims Speed Record for Climb

Leduc 022 ramjet aircraft, designed by French engineers, reportedly has climbed at an angle of 70 deg. at a speed of 612 mph, claimed by the French as a national world

speed record for climb. The craft's hollow fuselage contains the large ramjet powerplant. The pilot sits lowly for transparent camouflage projecting ahead of the intake in the nose of the fuselage.

Domestic

Turbine engines for vertical-lift aircraft and powerplants designed with thrust reversers will be tested by General Electric Co. on a 4,500-hp test site purchased near Dublin, Ohio.

Aircraft stator motor has been built and placed in operation by General Dynamics Corp., reports John Jay Hopkins, chairman and president of the parent company.

New flight simulator duplicating performance characteristics of the Douglas C-119A, Lockheed C-112D and Cessna C-431 are being built for USAF by Curtiss-Wright Corp.'s Electronics Division at Caldwell, N. J. Total orders for the three simulators \$6,950,286.

Jet fuel contract has been awarded Sorensen-Vancouver Oil Co. by Trans Canada Air Lines for its fleet of 22 turboprop Viscounts. The agreement calls for over three 2.5 million gallons of JP-4 in 1955 and 2.5 million in 1956 and 1957.

Ford Aircraft Engine Division, Chicago, reports employment has leveled off at 80,000 following swiftness in production from Ford & Whitney R4560s to R4W 357 jets. Company expects 750 production a "low school" with contracts extending into 1957.

Northrop Aircraft Inc., Hawthorne, Calif., says it delivered more than 60

reconnaissance and transport during 1954 than in any previous 12-month period in its 17-year history.

Hugh de Haven, founder of Crash Injury Research, was cited for his pioneering work in transportation safety Dec. 21 at a luncheon in New York's Wings Club honoring his attainment from Cornell University Medical College.

Lightplane exports totaled 36 aircraft at a combined value of \$157,510 during November, bringing overseas shipments during the first 11 months of 1954 to 447 units at \$6,585,270, reports Aircraft Industries Assn.

Airframe industry will quadruple its tonnage during the next five years and volume into 1955, forecasts A. R. Rose, Jr., western regional vice president of American Airlines.

United Air Lines DO-7 set a speed record of 2 hr. 27 min. last week on a Seattle Los Angeles flight, bettering the previous mark by 9 min. Scheduled time on the route 3 hr. 15 min.

Army helicopter competition for a high performance, four-place utility aircraft brought out contenders from direct army companies. The contest will be between Army's present three place utility craft and the Sikorsky H-19 that carries 8-10 passengers plus a crew of two. Instruction for both set Jan. 1 for a decision, but officials at some participating firm say doubt that a winner will be picked before spring.

Financial

Cessna Aircraft Co., Wichita, reports net earnings of \$2,175,473 for 1954, highest in the company's history. Sales totaled more than \$95 million and exceeded those of 1953 by \$1.5 million. During Nov. 30 approximately \$35.5 million.

Kennan Aircraft Corp., Bloomfield, Conn., will pay a 10-cent dividend Jan. 15 to more than 2,000 stockholders of record Dec. 31, the first payment declared by the helicopter manufacturer. Kennan's directors expect to continue dividends on a quarterly basis.

International

British Overseas Airways Corp., Southampton shipped over, caught fire and exploded Dec. 25 seconds after it touched down at Prestwick, Scotland, on a London New York flight. Most of the eight survivors out of 16 persons aboard were in the transport's nose, blasted free of the burning fuselage by the explosion.

First quality delivery since World War II of Japanese-built planes has been made by Towa Aircraft Corp. The company landed over four F4U's: FD-25A to the Canadian air force.

Complete B-24 Superfortresses have been delivered to Britain's Royal Aircraft Establishment for fatigue crack tests. Rustel Aeroplane Co., holder of the fatigue program, sent the aircraft to the test section.

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WHO'S WHERE

In the Front Office

Lord Howe and A. G. Elliott have resigned as joint managing directors of Rolls-Royce Ltd., will remain with the British company to ensure continuity and coordinate new chairman. Changes in the Aero Engine Division: J. D. Pearson, managing director, A. A. Lambard, chief engineer. New board members are as follows: A. A. Rollos, technical director, A. F. Keffey, general manager manufacturing, Aero Engine Division; D. E. McDonald, business secretary, succeeding G. D. L. Campbell, who resigned.

Walter Flynn, public relations director of Air Transport Union, has been elected a vice president.

Ben F. Wanner is new vice president and general manager of Coast Pacific Manufacturing Co., Los Angeles.

Walter Edmunds, Jr., Santa Barbara, Calif., attorney, has been elected to the board of Southwest Airways.

Oliver E. Robinson, founder and retired president of Robinson Engineering Co., subsidiary of Raytheon Co., has become a director of the Detroit Joint Area.

Changes

R. E. Biting has moved up to design director of de Havilland Aircraft Co., Hatfield, England, in a reorganizing intended to give him more time to study new aircraft in early design stages. Other changes at Hatfield: C. T. Wilson, chief designer; J. T. Smith, design chief designer; A. G. Patten and R. E. Owen, assistant chief designers at Chesham; W. A. Tansley, chief designer; F. Hamilton, assistant chief designer.

Herb C. Reinhardt is manager of Sperry Gyroscope Co.'s new Automated Equipment Division, Great Neck, N. Y.

D. N. Taylor has been appointed consultant of Blom Manufacturing Co.'s Government Products Division, Downey, Calif.

Harold Bauman has become chief engineer of Taurus Products, Inc., Los Angeles.

Honors and Elections

Stanley Miller, P., president of Hillis Helicopters, has been elected 1955 chairman of Aircraft Industries Ass'n's Helicopters Council.

R. G. Deibel, aviation department manager of Kiewit Standard Oil Co., is 1955 chairman of the Aviation Technical Service Committee of the American Petroleum Institute's Division of Marketing.

Rand M. Farn, sales executive of Aerojet, an Aerojet Corp.'s Systems Division, has won Civil Aeronautics Administration's Pioneer Award for his "outstanding contribution to aviation."

Richard C. Palmer, assistant to the president of Fairchild Engine and Airplane Corp., Huntington, Mass., has been appointed to a two-year term on the Joint Federal Military Aeronautics Advisory Committee of the National Security Industrial Ass'n.

INDUSTRY OBSERVER

►Rolls-Royce R.B. 109 turbo-prop is 9 ft. in length, has a bore diameter of 31 in. The bare engine weighs 3,350 lb. and with propeller weighs 4,786 lb. It is expected to run as a complete engine on the test stand in February.

►British Aircraft's latest Olympus turbojet, the B.D.6 is expected to develop 15,000 lb. thrust. Engine model now in production for the Avro Vulcan bomber develops 11,000 lb. thrust.

►Latest model of the Flanders utility plane was flown recently by project engineer John Thorp. New model has a sliding canopy, new rudder and fin and other improvements. Seats sit of the hoppers in the agricultural plane now live all other flies toward the center, giving passengers more leg room.

►Suzanne's mid-flow Vulture turbojet engine has reached 13,200 lb. static thrust on the test stand. The big new French gas turbine held that thrust 5 min. to qualify for the increased power rating. It originally qualified at 9,000 lb. in 1951, completed 15-hr test run at 12,100 lb. last summer (Aviation Week July 19, p. 149). Quantity production is scheduled this year.

►British Aircraft Co.'s lightweight, medium-thrust Olympus turbojet has started its running trials, less than a year after start of detailed design. Olympus, specifically designed for operational light fighters and trainers, is scheduled to power the Folland Gnat. First Olympus model will develop about 5,770 lb. thrust. Ultimate thrust for the engine powering the Gnat will be 4,500 lb.

►Fast Duane-Pfister Helicopter Ltd. LZ-5 is scheduled to make its initial flight only in March. The eight-place LZ-5 is Canada's first production helicopter.

►Fiberglass glass reinforcement in combination with modified silicone resin is scheduled for use in new high-speed bomber radomes to withstand temperatures of about 100F induced by aerodynamic heating.

►Look for British design emphasis to shift to post-atomized engine. Study of Boeing Aerospace Co.'s reasons and methods has led British thinking to the conclusion that it is a better way after all. It is reported that the next Avro Vulcan will have post-atomized engines.

►French S.E.20 Camille twin jet transport now in undergoing preflight tests on portions of its fuselage. Cabin windows have been tested successfully at 10 times the normal cabin pressure. Window glass was then tested deeply and sustained static under pressure 10 times normal, according to official French sources. In other trials the window glass was subjected to temperatures of 55F on one side and 140F on the other side.

►New aluminum alloy known as "three percent magnesium complex" has been developed under USAF request. This alloy has an ultimate strength of 508,000 lb. per sq. inch heat treated.

►USAF is working on development of a completely automatic aerial refueling system for all weather operations.

►Combat speeds of military aircraft will increase to Mach 5 and planes will operate at altitudes of 100,000 ft. during the next 10 to 20 years, according to Col. W. A. Huisman, chief of the Tactical Weapons Systems Division of Air Research and Development Command.

►Army is covering field artillery batteries from conventional cannon to Honest John guided rockets built by Douglas Aircraft Co. Minimum transition troubles are expected, because of simplicity of systems. For example, for example, is practically the same.

►Now in concern over lagging production schedules at the Douglas El Segundo, F-4D Skunk, for example, made its first flight in January 1951, still has not reached the fact to operational numbers.

Willis Exit?

Charles Willis, assistant to Sherman Adams, top presidential aide, is expected to resign his post in the near future to head an electronics firm. Willis has shown a keen interest in aviation affairs during his two years as the White House assistant. He operated a scheduled cargo airline after World War II.

He has been involved in the Administration's patronage program which has drawn strong criticism and threats of investigations from Democratic Senators.

New CAB Standards

Civil Aeronautics Board set some important standards in deciding the new Atlantic final route rate case. Policies used in fixing the rates set new precedents in some cases, chiefly insofar as others.

The Board refused to allow state losses to be counted as a business expense in figuring rates. "It is so fixed," said the Board, "a basic level of fair government policy there be no private interference in a labor controversy and that, except where otherwise required by the public welfare, the resolution of differences between management and labor be left to the parties."

"Obviously, view we to maintain the current from the financial loss of a strike we would desire labor as of most significant economic weapon, and would like to make basic in management's side. Now do we find that that can extend to pay strike losses will necessarily put the scale in labor's favor or lead to unreasonable subsidy losses."

Expenditure claimed as "non-divisional" and non-operating are labeled "extra services" and must be reduced to meet needs. Such items as income from investments in other companies and government securities are included in this category.

The net of return on investment for future periods will now be 5% instead of 10% applied to the profit. The Board noted that the "unconstrained and substantial" of international operations are considerably reduced today from what they were at the outset.

The Board established a uniform rate for Trans World Airline and Pan American. It was not understood that TWA's rate in cases where they have been exceeding PanAm's operations of the Boeing 747 after four and a half years and 525 million of support.

Murray Successor?

Former Republican member of Civil Aeronautics Board Harold Jones, widely California attorney, known as a leading proponent to become Undersecretary of Commerce for Transportation. His brother, Joseph H. Jones, former Administrator, has been widely publicized as an Administration choice for the post. Robert B. Moore, Jr., present Undersecretary, leaves the post Jan. 10.

The post has been controversial since it was established in 1950 to coordinate government policies toward various forms of transportation. The jurisdictional line between the Undersecretary and Civil Aeronautics Board is hazy. The first appointee to the post, Delta Reardon, invited conflict with Congress by a "hands-off" policy. Undersecretary Moore, as the other hand, staved criticism by proposing an "airport police" which empowers questioned should be decided by Civil Aeronautics Board.

Threat from India

Report is that Pan American Airlines and Trans World Airlines will be permitted to continue their schedules into India, but under traffic limitations. India reportedly has threatened to kill U. S. air operations in that country. The bilateral agreement under which PAA and TWA have restricted operating rights in India expires Jan. 14.

The Indian government has declared that it will not renew the agreement. Informal observers, however, believe that in the meantime the Indian government will go no further than to limit or restrict operations for PAA and TWA, aimed at constructing international air transport companies with Air India International, which now operates to London. Most other international airlines operating into India now are under such restrictions.

Flight Time Squabble

American Airlines and Air Line Pilots Assn., still embroiled in a lawsuit resulting from a recent strike, could soon agree to a settlement to extend the 5-hr domestic flight time limit to 10 hr for regular carriers. Extension was requested from Civil Aeronautics Board by North American Airlines so that it could operate nonstop transcontinental service with a recently acquired DC-6B (Aviation Week Dec. 10, p. 78).

American told CAB it would be compensating pilots to allow North American to perform a solo service which is in direct opposition to the limits of authority laid out in the exemption order which it operates. As discussed in "The labor stop is a series of low conditions committed by 'North American' in open and unqualified defiance of the Civil Aeronautics Act and the rules and regulations of the Board."

In attacking the rule for legal irregularity, ALPA takes a swipe at the whole idea of extending the 5-hr rule. The union declares it is the "unreasonable" that the rule has been relaxed granted American, United, TWA.

It holds that it is all aimed with perverted intent to avoid American, not "unreasonably," North American, following in American's footsteps. Does not come before this Board with clean hands. It is not understanding that flight have now been scheduled for 7, 8, and 9 hrs, which is a completely unrealistic schedule but avoids the requirements of the flight time regulations pending the Board's action on their request for a waiver.

Wilson and the Hill

Defense Secretary Charles E. Wilson, who says he is having some unexplained problems due to the shift in control of Congress to the Democrats (Aviation Week Dec. 10, p. 9), sometimes gets in line with the majority. Capitol Hill Senator Henry M. Jackson (D., Wash.), and Edna Kefauver (D., Tenn.) had backed Wilson's recent directive on speeding the mobilization law as a means of his policy which, they charged, constituted a contract in the days of a low large corporations.

The Secretary denied his policy has been reversed. "I quoted a reporter, 'Have you informed Senator Jackson and Kefauver of the change?'"

"I paid attention to everything like that," Wilson replied, "I wouldn't have my eye left at all to run the business and I don't start it and I feel so good about it for stopping it." —Washington staff

Second Report From Formosa:

Red Airpower Threatens Offshore Islands

- Most of Chiang holdings could fall to invaders.
- Lack of planes precludes mainland invasion plans.

By Don Korman
(McGraw-Hill World News)

Taipei—An intensity of Nationalist China not only provides most of the offshore islands vulnerable to Communist invasion but also provides the possibility of an attack on the mainland by Chinese Nationalist forces.

While the Nationalists maintain they could establish a beachhead on the mainland and hold it with little difficulty, fighter units would be essential and the increased superiority of the Red air force (Aviation Week Dec. 11, p. 14) would have to be considered. However, of greatest concern right now is the threat to Nationalist-held islands. An invading army of 80,000 to 100,000 men could take about any of the offshore islands, including the 30 relatively large ones, if the Nationalists had to fight alone.

And, indeed, if there is disagreement within the Nationalist high command on military policy, all agree that Chiang's troops, without American aid, could not hold out on the main islands if the Reds attacked in force.

U. S. Aid—The Tachen is particularly vulnerable. A sturdy building of Red air strength along the Chinghai coast opposite Tachen is addition to a well-organized network of Communist-held islands, eventually will enable the enemy to subdue this area.

Members of the high command here suggest that planes of the U. S. 7th Fleet—only up to four capable at a time in the region, each capable of carrying about 50 aircraft—might be used to push Nationalist planes on patrol.

Actually, American plans to patrol occasionally within 12 miles of the mainland and Hainan Island, making encounters with Communist aircraft. They cover a much wider segment of coastline than the 7th Fleet destroyers and operate much closer to Red air and most based in the Shanghai region.



OFFSHORE ISLANDS held by Chinese Nationalists are easy prey for Communist planes.

Two Few to Red—"The Communists are not too anxious to control the sea," a high command official says. "What they want is to big a large number of troops. We have two to defend the sea. We should conserve all our military strength for the one silent invasion of the mainland. We must think in military rather than political terms, or we might lose everything."

So completely does the Red air force dominate the air that a large percentage of Nationalist planes are chased back to Formosa long before striking their offshore island destinations. To avoid radar detection, Nationalist planes must fly at very low altitude in long as possible.

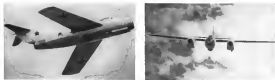
The Communists have so many more planes than the Nationalists that they

do not have to worry about altitude. Their MIGs fly high, their Tu-16s fly at medium altitude and their prop-driven planes fly low.

Nationalist aircraft are sent on about 150 missions a week, according to Communist activity, but most are simply for patrol purposes. Only occasionally—and always when it is light—do their planes seek through the Government as defense action in bombing missions.

Comm Foes—Usually, the main target of the Formosa-based attacks are the Red-held islands north of the Tachen-Formosa line. On Quemoi, which has an excellent radio, generally gas for Red military positions in neighboring areas to the west.

Henry King, long Communist-held



AGAINST some 180 Chinese Communist MIG-15 jets (left), 180 B-27 jet bombers (right), and hundreds of piston-engine planes.



CHINESE NATIONALISTS can muster more than 500 fighters of all types, mostly obsolete piston P-4Cs (left), a few jet P-4Gs.



HANDFUL OF SARRES have moved on Taiwan, ranged at short 75 sweeping planes.

Ames, combined with that from Wu Yu to the east and Lanchow to the north, can all but blanket Big and Little Quemo, the northeastern islands.

Nationalist air attacks are made on Red bases on the mainland, but they have been the least effective of all because of their behind-us nature.

► **Plot to Oust—**About six Nationalist planes have been shot down since this island spy started in earnest last September. Three F-4s are believed to have been killed by anti-aircraft fire over Quansay and three by MIG fighters in the Tachien area.

Approximately 70 aircraft, mostly P-4Cs and P-4Gs have suffered damage. Altogether, more than 10 crew men have been killed.

The Reds have lost only six planes— a MIG shot down by an F-47 south of the Tachien. One other MIG is reported to have been damaged.

► **Outdated Network—**The Tachien De Jans Command, which includes orders for jet attacks is obsolete in the Tachien jumper, could probably see more out-of-date guns and obsolete radar equipment. This is particularly true of the Yachien, only 60 miles southeast

of the Red naval base at Yenchow on Chekow Island.

The Nationalists' radar network still is made up largely of outdated World War II equipment. The U.S. has promised to send about six modern sets, but only a few parts have arrived so far. The proposed network would give Formosa about 20 minutes warning of an enemy air attack.

► **Insane Financing—**Should the Nationalists attempt an invasion of the mainland, large stretches of beach—particularly heavy beaches—would play a major role, military experts here say. The Formosan island would struggle bombing for lack of money; the people, as when they would have to depend for support, against their.

Although Chiang's forces would need American naval and air aid, they maintain they would not want U.S. troops. For this, they say, would give the Reds the chance to win the idea to the Chinese people that China was being invaded by American arms.

The Nationalists hope that their relatively small force would be sufficient to hold a beachhead for three or four months—long enough, they figure, for a large-scale defense of Red troops.

They also say the Communists would be unable to concentrate more than 30,000 to 40,000 of their 3 million troops in any one area because of the long coastline they must defend.

► **Long, Slow Buildup—**Although the Nationalist air force is not prepared

now to attack the Communist main land, it has come a long way since May 1951, when the United States started to supply Formosa with military aid under the aegis of the Military Assistance Advisory Group (MAAG).

At first time, Chiang Kai-shek's military consisted of only about 100,000 combat planes. It had no jet fighters and few piston-powered fighters or patrol and reconnaissance aircraft.

MAAG, whose 540 American officers and men are under the command of Gen. William C. Chase, former commander of the First Combat Division that was the first to enter Tokyo during the war, has done an excellent job of training and arming the Nationalist Chinese military leaders and seeing to it that material received from the U.S. is used wisely.

► **L200 Combat Pilot—**One of MAAG's most important functions has been to train pilots in the modern jet aircraft Formosa is getting. A large percentage of Nationalist China's air units L200 combat pilots, who average from 45 to 100 patrol or combat missions each, have been trained under this program.

Col. Stapp withdrew consideration from of up to 1,500 MIGs during the run to the 1958th track. Ward was again favored to win more than two times as 7.7 per.

The tests were designed to reproduce conditions experienced by air crews in separate balloons.

► **Hughes Aircraft Co.** and Radioplane Co., a subsidiary of Northrup Aircraft, Inc., were awarded a \$1.5 million contract for the test and Stapp won a full contract to build the balloons.

► **Training Rates—**Hughes and Radioplane Aircraft (1947) is a jointly owned agreement to provide for a pay increase of 6 to 8 cents an hour for approximately 6,000 employees in the Colton City, Calif., and Los Angeles plants. The agreement was announced with the company's promise of meeting the prevailing market industry rates in the area, and W. G. Tietze, national relations director.

Walter G. Collins, president of Northrup and Radioplane, and the agreement with KPA, Inc., an independent union, gives insurance reimbursement to 6 cents an hour for 1,000 workers at the plant's aircraft factory's Van Ness, Calif., factory.

► **Cent Rate—**New labor contract at Cinnac, calling for wage increases averaging 7 cents an hour, was ratified by members of the International Association of Machinists (IAM). Also included is a provision for no increase in group insurance benefits.

The Cinnac-IAM agreement covers 15,000 hourly paid employees at the plant's plant in San Diego.

► **Longer Take—**Libco contracts at River Aerobatics Co. and Seltzer Aircraft Co. in San Diego still are to be negotiated.

Stapp Plans Supersonic Sled Test

Los Angeles—Col. John P. Stapp hopes to reach a supersonic speed that would blast him with a wind of 34 mph before he ends his arrow-bolton test on rocket-propelled sled.

The scheduled seventh attempt, "Tartar run on earth," involved his gun after he declared last week that he set a record of 652 mph last month on a sled at Holloman Air Development Center—fast enough to pass a Lockheed F-80 jet trainer flying overhead.

Stapp's latest speed run on the sled, built by Northrup Aircraft, Inc., broke his own world's land speed record by more than 200 mph. He reached 420 mph last summer, topping the 405 mph record for land travel set by John Cobb in a racing car in 1947.

► **1-500, 1-2000** The 3,000-lb sled, propelled by the 46,000-hp thrust of two rockets, reached its 612-mph speed in five seconds after traveling 2,600 ft. After coasting for half a second, the sled was decelerated to a halt in 1.4 sec. by a water brake.

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COL. STAPP: "And then came the rocket."

truck. The latest speed run started 1 ft. from the head of the track and lasted in a half mile 12 ft. from the end.

"We could make it faster with a longer track," he says.

The USAF is probably will try for supersonic speeds on longer tracks available at Edwards Air Force Base and Fort Worth Naval Air Station.

Airline Traffic, Safety Make '54 Record Year

New safety and traffic records were set by commercial airlines in 1954. Civil Aeronautics Administration reports.

By the end of the year, CAA estimates the U.S. domestic and international scheduled airline carried 34,671, 000 revenue passengers, a 19% increase over 1953, and 50.2 million revenue ton-miles, passenger miles and 262,052,900 cargo ton miles.

► **Low Fatality Rate—**The safety record for scheduled operations resulted in a new low passenger fatality rate of 0.08 per 100 million passenger miles, down from 0.45 in 1953 and a considerable drop from 2.6 in 1954.

Despite the accident epidemic for 15 months, 22 days without a fatality. The scheduled safety stretch was broken Dec. 22 when a Douglas Flying Service DC-3 crashed near Pittsburgh as an A-10 fighter jet, killing 10 of the 23 passengers aboard.

► **New Increases—**Other cost increases in 1954 include:

- **Business fares** increased from \$6.10 to \$6.25 as an increased 1.9 million to 1,900,000 more than the previous years by all scheduled airlines.
- **CAA control** over traffic was set by nearly a million loadings, from 35,613,

Aircraft Industry Backlog: \$14.8 Billion

Backlog of unfilled orders for complete aircraft, engines and propellers totaled \$14.8 billion at the end of this year's third quarter, the Department of Commerce reports. That was a drop of 2% from the previous quarter.

Orders for 1.6 million customers represented 94% of the aircraft backlog, 80% of the engine orders and 66% of the propeller backlog.

Total net sales during the third quarter amounted to \$2.5 billion, representing 17% of the total backlog at the end of the quarter.

	Quarters ended				
	Sept. 30, 1953	Sept. 30, 1953	Oct. 31, 1954	Nov. 30, 1954	Sept. 30, 1954
	(in millions)				
Total	\$16,207	\$16,752	\$16,500	\$15,247	\$14,838
Complete aircraft and parts	12,946	13,618	13,885	13,679	13,407
For U. S. military customers	11,330	10,948	10,664	10,022	9,929
Other	714	754	719	657	654
Aircraft engines and parts	5,173	4,688	3,997	3,361	3,254
For U. S. military customers	5,003	3,645	3,465	3,247	3,144
Other	149	181	312	116	118
Aircraft propellers and parts	264	235	190	185	192
For U. S. military customers	234	181	168	169	174
Other	27	27	24	26	28
Other products and services	879	844	927	1,261	916

133 for 1955 to an estimated 17.5 million. For route traffic, measured by position reports, increased from 15,026,691 to about 16.6 million.

New airports and air communication by CNA in 1954 included 11 additional air-sea surveillance radars, 235 direction finding equipments, one instrument landing system and 34 very high frequency communications.

NACA Forms New Flight Safety Group

National Advisory Committee for Aeronautics last week formed a Subcommittee on Flight Safety to study hazards to crew, passengers and airplanes in aircraft operations.

Recommendations by the subcommittee will be made to NACA's Committee on Operating Problems as to what investigations should be conducted or other actions taken to eliminate or reduce the hazards.

Duties on the Subcommittee on Air Safety, Fire Protection and the Panel on Aircraft Storage will be taken over by the new subcommittee.

Review, Recommendation is covering not only equipment, the subcommittee will study safety.

Reviews research in progress by NACA and other agencies.

Recommendations that should be investigated by NACA or other agencies.

Work on developing and coordinating programs for research.

Serve as a medium for interchange of information regarding investigations and developments in progress or proposed.

First organizational meeting is scheduled for February. Location of the meeting has not been decided.

Chairman: Melvin T. West. The subcommittee is headed by Charles F. Brackley, vice president-engineering of Eastern Air Lines. Boyd C. Myers, NACA, is secretary.

Other members are: Dr. Albert W. Hetherington, Jr., USAF, Research and Development Command; Lt. Col. John P. Ship, USAF, chief, Airomedical Flight Laboratory, Hurler Air Development Center; N. M., Capt. Rache H. Baker, Jr., USAF, Director of Flight Safety Research, North Atlantic Command; Samuel G. Pearson, USN, Aviation Safety Division, Office of Deputy Chief of Naval Operations (Av); W. A. Krieff, deputy chief, Aircraft Engineering Division, Civil Aeronautics Administration; John

M. Chamberlain, director, Bureau of Safety Regulation, Civil Aeronautics Board; Melvin N. Gough, Langley (Va.) Aeronautical Laboratory; Irving Brink, Leach Flight Population Laboratory (Cleveland, Ohio); Carl M. Chatterton, United Air Lines; Allen W. Diller, director, Engineering Division, Air Transport Service; Paul M. Pitt, Jr., Ohio State University; Scott Flosser, Pan American World Airways; A. Howard Hurler, executive director, Aviation Crash Injury Research, Cornell University; Aviation Safety Council; Harold E. Holen, preliminary design group, engineering department, Lockheed Aircraft Corp.; Otto E. Kitchner, preliminary design unit, engineering department, Boeing Airplane Co.; Joseph L. Lohr, executive director, Flight Safety Foundation; Dr. Ross A. McFarland, Harvard School of Public Health; William J. Skelton, design safety engineer, Republic Aviation Corp.

Chairman Joseph P. Allen is an aviation member of the NACA subcommittee.

Budget Bureau Backs ACC's Air Policy Role

Bureau of the Budget, in one of the White House, is supporting the Air Coordinating Committee's role as the overall administration agency for the overall administration of the air policy "parade review of civil air policy."

The bureau views ACC as "a valuable mechanism for the coordination of aviation policies, programs, procedures and standards."

In a survey of ACC, the Budget Bureau declares it "should be retained and supported by the participating departments and agencies."

Review Mechanism—ACC's first civil aviation policy report was its creation in 1946, made for going under the chairmanship of Chairman Under Secretary for Transportation Robert Murray, several conferences.

Key Carl H. Rouse and other aviation personnel have been and the committee should be reduced to coordinate administrative activities and should not research on civil aviation policy action.

On this segment, the Budget Bureau comments "ACC provides a mechanism for periodic review of air policy, but the findings and recommendations derived from such surveys will reflect many commissions and will not be complete policies which the participating federal agencies are prepared to propose and implement."

Positive Role—The Budget Bureau supports participation in ACC by Civil Aeronautics Board and other quasi-judicial regulatory agencies, observing "Regulatory commissions represented

on the ACC cannot, of course, dispute parties at variance at the right of having and present on the facts as provided by law, but such commissions can, and should, play a positive role in the committee and engage in the best possible exchange of information with other participating agencies."

The committee's members are, therefore, a stumbling block to making decisions, should be continued, the subcommittee.

The bureau also expects that ACC "cannot compel member agencies to implement its decisions." On legislation to be proposed to Congress, "ACC should not attempt final coordination of the views of the executive branch... but should it seek to coordinate agency views on legislation before Congress."

ACC Making—Chairman points the bureau made in its survey.

Federal Communications Commission should be a member, and a White House committee should participate in ACC activities on a liaison basis.

A management and strong group, equipped of ultimate responsibility, of each of the major agencies participating in ACC, should be formed to promote ACC's effectiveness.

Of ACC's four major subdivisions, the bureau comments: The Economic Division "has fallen short of its potential and should be reconstituted as an Economic and Resources Division."

The Subcommittee on Facilitation of Civil Aviation "needs to be strengthened both in terms of membership and agency support of it as a subcommittee facilitation is an important element in the aviation economic program of the U. S."

The Legal Division has "performed its functions well, but a clearing should be chosen to soon be possible."

The Technical Division has been "one of the most successful and highly regarded of the components... but it could serve more effectively in the future if all the members were of the standing in their agencies warranted by the major technical problems coming before the division."

Meacham Buildup

Development of Meacham Field, Key West, Fla., through the aid of federal and community funds was recommended by Air Coordinating Committee's airport use panel.

At the same time, panel cordially urged use of Boca Chica, Naval Air Station at Key West, was turned down by the group.

The panel also recommended that a Meacham Field runway be enlarged to reduce traffic pattern conflicts with Boca Chica.



TWIN-ENGINE LAUNCHER is loaded with two Corsair Terrier anti-aircraft missiles. In action, loading procedure probably would be automatic to speed up, safety handling.

First Closeups of Convair's Terrier



ARMED USS MISSISSIPPI, missile recently completed two tests of intensive tests. Convair's Terrier and Terrier, will be first of first guided missile tests.



FOOTED SKYWARDS, Terrier heads for target. It reportedly has good reliability record and recorded high rate of kills. Assort contains rocket propellant range of about 20 mi.

Air France Blames 'Politics' for Losses

(McGraw-Hill World News)

Paris—Reports here that Air France will show a \$10-million loss on its 1954 operations because of widespread at year's end that company president Max Hymen called a news conference to detail the airline's problems in an effort to control criticism.

Hymen blamed political considerations involved in operating a government-owned airline for the cause of Air France's financial and operating woes.

► **Pledge Support.**—He makes this familiar European complaint. Clearly, however, especially political in nature, are demands of the international air carrier because at a government-owned, at the same time, it is treated as a private company for accounting purposes.

Clash among the political powers is questionable cost believed by the government to be necessary and desirable for non-commercial aims.

Hymen says government pressure to see French-built transports as a means of supporting the aircraft industry resulted in seven different types of equipment in the Air France fleet during 1954, forcing the airline's operating expenses higher than normal.

Hymen also cites three expenses: ► **Cost of groundings** last year totaled in loss of aircraft and continuing costs. No schedule has been reached with the International Airline Co. on possible compensation for the four jet transports grounded by Air France.

► **Airport taxes** paid to the government have nearly doubled in five years.

► **Increasing fuel costs.**—On borrowed funds, Hymen reports his airline pays an interest rate of 7.5%, substantially higher than is demanded of carriers in other countries. In 1953, he says, interest charges total \$14.6 million.

He also charges that Air France is forced to depend on medium-term loans to a large extent, and uncertainties regarding this year will rise to \$18 million—nearly 10 times the amount in 1953.

► **Foreign Competition.**—Hymen predicts a period of strong international competition, with the airline industry entering a period of "overcapacity" in which too many seats will be available.

He fears this will result in a return to "defiant competition," with gifts to customers and possibly the growth of a system of subsidies. The Air France chief sees itself, one result of increasing competition, has lost its airline some of its revenues, particularly on routes within the French nation.

Texas Atlantic air traffic patterns also are shifting to the disadvantage of Air France, Hymen reports. American travelers to Europe in 1954 made their last stop in some other country over Louisiana than in France.

Finally, Hymen says postal revenues failed to increase during the past three years and predicts a decline in 1955. In his view, annual payments are so severely low.

► **Overall Solvency.**—The airline president proposes that the French government should provide some type of overall subsidy for "perished routes" it wishes Air France to fly.

He also forecasts close links between Air France and the heavily subsidized Canadian Constellation Transatlantic (the French Line).

Local Service Route To Switch to Trunk

Civil Aeronautics Board has decided to change Russell Airport Route 106 from a local service to a trunkline route and parcel out certain points to United and Constair Air Lines.

The present route extends between the terminal points of Chicago and Sioux City, Iowa, via intermediate points of Rockford, Dubuque, Chicago, Waterloo, Mason City and Ft. Dodge. ► **New Makeups.**—Here is how the route will look:

► **United** will continue to operate Route 106, but in a trunkline route between Chicago and Sioux City via Mason City and Waterloo. The airline cannot schedule one plane service between Chicago and Minneapolis. Paul via an intermediate point on Route 126. The aircraft is scheduled Sept. 30, 1955.

► **United's Route 1** is intended to include Ft. Dodge, Dubuque and Rockford as intermediate points on September 1, 3 and 6 until Sept. 30, 1955.

► **Constair's certificate** for Route 107 is intended to add a new segment authorizing service between Dubuque/Moline and Chicago via Clinton and Rockford.

► **Service, Economy.**—United got Route 106 when it took over Mac-Combs Airlines and its system in 1952. The airline has been adjusted a number of times but has maintained its local service characteristics up to now.

CAL now believes the new makeup will improve service greatly to the all-located points and save the government money at the same time. Estimated business need under the new setup will be \$215,166, compared with the current cost of \$195,625.

The main traffic difficulty with the route is that the flow generally is toward Chicago with relatively little to Sioux City. High traffic density between Rockford and Chicago creates a bottleneck, and contributes to low load factors on the western part of the route. The theoretical Chicago-Rockford link is inoperative and blocks much potential local traffic from obtaining space.

► **Lost Opportunity.**—CAL member Donald Form estimated from the airports decision. He favored a plan that would remove the local service characteristics of Route 106, giving the bulk of it to Constair and parts to United and Russell.

"The Board has had the opportunity of proposing Constair a carrier whose prospects for future expansion are limited, with additional productive route mileage which can be of substantial assistance to the carrier in its progress toward self-sufficiency," he said. "That opportunity should not be lost."

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Cessna Holds Price Line On New 180

Cessna Aircraft Co.'s 1955 version of the four-cylinder, aluminum Model 180 business plane continues to sell for \$17,575. F40, Wichita, Kan. Investments in engine and airframe make the new 180 quarter inch per second model, Cessna reports. Its Continental O470-D is operated with one-half standard power and 120 hp, to provide more than 130 mph cruise speed. This feature, plus addition of the auto air intake valve, the propeller and a new propeller, make the 180 a true business plane. Two-gram combat is three-times faster than for improved landing and turning characteristics. An optional constant speed prop is provided at no extra cost. The 180 is approved for day and night.

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Basic Airpower Debate Shapes Up

Navy Secretary Thomas makes it clear he will defend aircraft carriers and the role of sea power all the way.

Los Angeles—The U. S. Navy's debate with British Field Marshal Viscount Montgomery over basic weapons systems is shaping up as one of the most important since the B-36 controversy.

An angry attack by Navy Secretary Charles S. Thomas against Montgomery's demand that the United States stop building aircraft carriers unless it acquiesces the Navy intends to fight the British soldier's views all the way.

Thomas followed a similar rebuttal earlier this month by Assistant Navy Secretary for Air James M. Smith, Jr., who said carriers have "unassailable ability" (*Airman's Week* Dec. 13, p. 16).

► **Strategic Defense**—Thomas chose this man for a series of press conferences and speeches defending the U. S. Navy's strategic views.

It was here at the California Institute of Technology that Montgomery publicly launched the military debate by insisting land-based airplanes soon will control the seas, a concept calling for bigger air forces and smaller bases with no carriers (*Airman's Week* Dec. 6, p. 12).

Montgomery, Deputy Supreme Commander of Allied Forces in Europe, presented the same views in conferences with President Eisenhower and U. S. military planners, arguing that atomic and thermonuclear weapons require a complete reorganization of the military organization of the West in order to maintain air supremacy—the key to any future war.

Montgomery presented a conviction that the Navy's future role would not require more than small ships and submarines.

► **Mobile Air Base**—Criticism of the British military figure by Thomas makes it plain that the Navy has decided to make the debate a public one rather than a battle behind the closed doors of the Pentagon.

"Field Marshal Montgomery is not always accurate," Thomas said. "His general's career is actually a mobile air base, one that can cause the potential enemy to redirect his offensive and do feasible tactics."

In addition to his press conference remarks on Montgomery, Thomas attacked the Field Marshal's recommendations in a speech before the Institute of Foreign Affairs at Riverside.

"In these days of supersonic planes, nuclear weapons, and guided missiles we must still have sailors and sailors, sailors, tanks, grenades and bayonets, submarines, ships and landing craft as we go

nowhere as in Korea, as well as global bombing and extreme artillery weapons," the Navy Secretary argued. "That is especially true when it is remembered that our fundamental philosophy goes to our opponent the nature of attacking when, where and what type of war they can win."

► **Fringe War Dangers**—Thomas locked up the Administration's massive anti-atom concept, saying "Quite obviously, the free world must end any country's capability for massive attack with nuclear weapons. Without this, we are surely doomed."

But the Navy's critics chief engaged the opinion that the great danger to the free world in the next decade is not hot war but continued cold war, with the danger of fringe wars "wherever and whenever we feel is essential to posture of strength and a program for resistance."

"I do not subscribe to the theory that a little war must necessarily grow until it becomes a big war," he said in an answer to Montgomery's contention that, if war comes, atomic and thermonuclear weapons will be used.

► **Indispensable**—Referring to what he termed the "indispensable element" of seapower, the Navy Sec-

Seaplane Bomber?

There is no reason why the Navy should not build seaplanes jet bombers "as large as we can to build them," Navy Secretary Charles S. Thomas told a Los Angeles press conference.

"As large as the Air Force B-12 in transoceanic bombers" added a reservation.

"I don't see why not with the ocean as landing fields," Thomas replied.

He then was asked whether this would create conflict with the Air Force. "No," the Navy Secretary said. "There is no friction today among the services. Air Force Secretary Tamm and I are good friends."

and "Mistakenly, seapower is still indispensable to survival and success, whether in global wars, atomic or traditional, fringe wars or cold wars. By itself, seapower cannot achieve a military victory, but it is still vital to say just no type or size of war can be won without seapower."

Thomas made it apparent that one reply to Montgomery's recommendation will be the argument that the Field Marshal is overlooking the importance of the Navy and its air arm in the cold war and in any fringe wars that might break out. The kind of Navy Montgomery describes would be in-



Eisenhower Awards Collier Trophy

President Eisenhower congratulates E. B. Rasmussen, chief engineer of Douglas E. Segal, awarded Collier Trophy for work on supersonic P-100. (U. S. News)

Major, North American Aviation head chairman, holding model of Super Sabre, was given Collier Trophy for development of the P-100 (*Airman's Week* Dec. 27, p. 16).

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factor in that type of warfare, Thomas emphasized.

Thomas outlined this role for the Navy.

"If war should be thrust upon us, success goes to the ability of projecting our strength overseas. Otherwise, our Army becomes reliant on local defense force as a band of refugees. A modern fleet has the ability to move quickly to any threatened area of the world, and to arrive, to move a variety of ends. It can support troops already ashore; it can assist the landing of additional troops. It can strike the enemy's airfields and supply bases, and if needed, it has the ability of making massive strikes deep into the heart of any such area."

"Simplicity also means that the world-wide activities which we have back around the two world are maintained, fueled, fed and supplied."

Secretary Thomas left no doubt in Los Angeles that the U. S. Navy is prepared to prove that Defense Secretary Charles E. Wilson was right when he said "Field Marshal Montgomery was a 'very brave man' to come to this country and suggest that the Navy project to abandon its sea area."



Air Pioneers

Army Bell righter pulls a parachute from a mountain in Governors Island, N. Y., in an unusual training exercise. One of the training planes who flew from the plane in eastern's only days. The mountain is a replica of a propeller from a Wright brother plane.

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collected at the plant in 1965, and from this was developed the D-1003. A few of these were built for the Swen, but production was halted after the decision in 1966 that made the de Havilland Vampire the standard Swen fighter.

A later attempt at a water-based lighter would not be too surprising since the Danvers plant also has a flying boat background.

Airport Council Wants CAA to Lower Costs

The Airport Operators Council has asked Civil Aeronautics Administration to modify its airport standards, saying meeting current ones jeopardize at leaving costs.

The suggested code revisions were adopted by the AOC in a recent meeting and submitted to CAA Administrator Fred B. Lee.

► **Design Requirements**—A large block of the recommendations deal with runway and taxiway design.

The council wants CAA to study runway width to see whether the present 200-ft. width required for large airports could be reduced, perhaps to 150 ft.

AOC also has changes in runway length requirements but suggests that modifications be required to design aircraft to meet present limitations.

AOC would have CAA establish definite standards for operation of parallel runways to permit landing on one runway and simultaneous takeoffs on an other under IFR conditions.

► **Taxiway Review**—A CAA study of taxiways is recommended to determine whether the 100 ft. width standard can be reduced. Such width reduction would produce savings both in capital outlay and operating cost, according to AOC.

Taxiway design for high-speed turn-offs should be reviewed, says the council, and recommended design data on various layouts published. CAA development of standard layouts for taxiway widening and for taxi areas also is recommended.

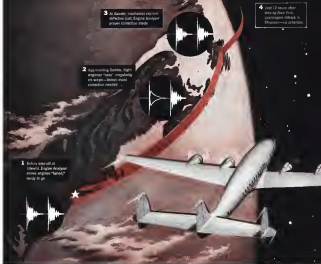
► **Budget Program**—The airport operators also ask CAA to:

- Review the need for surface friction index at major airports and establish a budget program for needed modifications.
- Set up off-the-shelf airport visual aids to guide pilots in and out of congested areas.

► **Consider** new taxi lights now being developed.

- Revise regulations to provide that fire and rescue equipment and its aspects be painted chosen yellow instead of red because of greater visibility at yellow in darkness and bad weather.

- Establish standards for runway intervisible paved areas.



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Stits Tests Folding-Wing Lightplane

A new lightweight business plane with folding wings—designed to be towed from an airport and stored in the owner's garage—is being flight tested by Stits Aircraft at its Riverside, Calif., plant.

The three-place Stits-Bailer Falcon two was designed and built for William Bailer of Bailer Corp., Oakland, Calif., to test the market potential for a fold wing aircraft.

■ **Heavy Plane Fold**—“I have 2 hr. and 15 min. flying time in it so far and its response is good,” test designer Bailer says. “It has the feel of a heavy plane—like the Cessna twins. And it turns well. It has been towed at a speed up to 50 mph.”

The wings are easily folded, he adds. “By simply raising a pin and moving about 2 lb. of weight, they fold back and are hooked to the fuselage.”

Stits says the prototype will be used

at a later date as a test bed for new six-cylinder engines.

This plane is a completely new design, the builder asserts. “We couldn't adapt any of our standard models to accommodate the folding wing.”

■ **400-mph Cruise**—The company reports the new plane, powered by a 170-hp Lycoming, has a top speed of 465 mph, and cruises at 150 mph. Range is estimated at 400 mi., with a 50 mi. gas reserve.

Other specifications of the Stits-Bailer Falcon:

Wing span, 39' 6"; maximum height (wings folded), 6' 11"; maximum length (wings folded), 19' 6"; maximum width (wings folded), 7' 7"; wing area, 120 sq. ft.; gross weight with pilot and two passengers, 1,150 lb.; net weight, 500 lb.; time required to fold the wings, 10 sec.

Sale price, about \$5,000.

Wilson Revises Small-Firm Policy

Facing with local complaints from small business and the prospect of criticism from the new Congress, Defense Department has revised its small business policy directive, pledging “an equal public opportunity to compete” for both advertised and negotiated small procurements.

■ **“Comprehensive, Effective”**—An overall purpose of the new directive issued by Defense Secretary Charles E. Wilson, “is to establish a more comprehensive and more effective Department of Defense small business program.”

To achieve this, the directive says, the Arms, Navy and Air Force will set out their regulations within 30 days to make sure these procurements could meet its aim.

■ **The bidder's ranking list must include all eligible small business firms.**

■ **Invitations to bid must be sent to all firms on the list, if they are not, a percentage of small business firms**

must be included in the review.

■ **Small business requirements must be considered in planning quantities, delivery schedules, time for preparation of bids and drafting of USAF, Navy and Army specifications.**

■ **Proposed procurements must be published.**

■ **The opportunity must be extended to bid for quantities less than the total procurement.**

■ **The source for potential small business suppliers must continue.**

The directive says the Defense Department will issue an additional instruction on how the revised policy will be carried out in respect to future sub-contracting.

■ **Comprehensive Personnel**—The new directive probably can be traced back to hearings held last spring by the Senate Small Business Committee. At that time Defense Department was urged by the committee to draft a comprehensive

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statement of its small business policy, drawing together the issues made that were scattered through a long series of instructions, policies, procedures and directives.

One feature of the new directive is that it sets down for the first time definition of the small business special unit and tells what he is to do.

These appointments were definitely outlined by Secretary of Defense Wilson.

Small business advice to Assistant Secretary of Defense for Supply and Logistics Thomas P. Pike, in addition to consulting the assistant secretary, the advice will represent him in Defense

Department contacts with the Small Business Administration.

- Office of Small Business for the Army, Navy and Air Force. The chief will be responsible for carrying out the Defense Department's small business policies.
- Small business specialists for each principal procurement office. These men are to "maintain the necessary independence of thought and action in the performance of their functions."

They must be men of high caliber, politically conscious, with small business experience.

The tendency of military procurement offices to evade and avoid contact with representatives of the Small

Better Break

Small business firms, those employing fewer than 500 persons, are assured of a better opportunity to win defense contracts by a new ruling from Defense Secretary Wilson that will limit up-keep orders to certain military items.

In his new directive, the Secretary orders the armed forces to include in their regulations the following guidelines:

"The procurement is divided into, or left in question may be submitted as, such assembly and component production lots as will enable and encourage small business concerns to make bids in question on such procurement of portions thereof—unless such division is clearly in the disavowal of the department."

Business Administration comes in for important consideration in the new directive.

The armed forces are ordered to let SBA representatives inspect their procurement records and give of requested information. When the SBA is not satisfied that small business has been properly represented, the military are ordered to cooperate in securing the situation.

In addition, assembly receipts must be held with SBA officials to evaluate reports on the effectiveness of the program.

ODM Grants Writeoffs For Research Facilities

General Electric Co. has been granted a \$6,673,000 certificate of writeoffs by Office of Defense Mobilization for a research and development laboratory, with 50% allowed for type test construction.

Other certificates granted by ODM are as follows:

Katharine Instrument Corp., Winchester, N. Y., already had certificate, \$1,747,000 under War Rel. Act, allowed.

General Electric Co., Westinghouse, W. Va., already had \$1,475,000 certified, plus 50% allowed.

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Sargent has been building dependable hydraulic and mechanical controls since 1880. Today, leading builders of military and commercial aircraft recognize Sargent's undoubted responsibility in research, engineering and manufacture as the standard of excellence for the production of these components.

The story of Sargent's organization, methods, and manufacturing facilities will show you how Sargent can work for you profitably and efficiently. Why not write today for your copy of the Sargent Aircraft Brochure?

SARGENT
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Aircraft Power Control
Assemblies • 2 Complete Sides
of Arms and Rear Actuators
• Actuating Cylinders • Primary
Components • Servo Valves •
Sequence Valves • 3-Way
and 4-Way Solenoid Valves
• Directional Valves • Relief
Valves • Pressure Regulators
Rear Valves • Pressure
Reducing Valves

Standard of Excellence

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"Good will" is the disposition of the pleased customer to return to the place where he has been well treated.
—U.S. Supreme Court

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Nonporous, non-wrinkle coverlight. Perfect for wing sections, tailplanes, longer door work, etc. 100% waterproof. Resists mildew, fungus... the toughest, lightest, longest-wearing protective covering you can use. Meets Fed. Spec.: MIL-F-7715 (AER), MIL-C-4479 (USAF).

Wherever a tough, non-flammable fabric is needed, **NEOPRENE-AND-PARALON COVERLIGHT** is your answer. It has all the qualities of Neoprene-Nylon Coverlight, plus the added advantage of flame and heat resistance. Ideal for escape chutes, fire curtains, safety clothing, etc.

INDUSTRIAL COVERING MATERIALS, Valves offers a wide range of fabrics available to meet the specifications of AMS 3270-B, AMS 3274-A and MIL-C-8066 (USAF), Type I.

Write for free samples and details of Coverlight and industrial coated fabrics.

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This winter season, Eastern Air Lines estimates that via their Giant Silver Fleet more than 700,000 people will exchange rigid ties for a warmer nest.

As these countless passengers rely on Eastern's reputation for fast, reliable transportation to Florida, so does Eastern rely on Sinclair Aircraft Oils exclusively for dependable aircraft engine lubrication. Today, 42% of the oil used by major scheduled airlines in the U.S. is supplied by Sinclair. Why not place your confidence in Sinclair Aircraft Oil?

...SINCLAIR AIRCRAFT OILS

Sinclair Refining Company, Aviation Sales, 600 Fifth Avenue, New York 20, N. Y.



FUEL TANKS IN THE RAW Fiberglass portions for 450-gal. tanks are prepared at Zenith Plastics. Closed ends on cylindrical portions (right) are later cut out; these portions become center sections of completed tanks. Finished units require no painting or treatment.

Tiptanks Could Be Scrap Gift to Enemy

In Korea alone, we throw away 50 million lb. of metal in expendable tanks; that's one reason planners are testing reinforced plastic.

By Irving Stone

Almost 50 million pounds of aluminum alloy were tossed away in expendable fuel tanks during the Korean conflict, according to industry sources.

The Korean war was a "hundred" war. New tanks of this loss in terms of a war-plastic conflict.

How many hundreds of millions of pounds would be "scraped" in combat?

How much of the metal would fall into enemy hands as scrap recoverable by him?

How much might the metal require repair for these expendable tanks? (It is an already light material) supply in loss of aerial warfare?

No Production Yet—It would be hard to pinpoint some non-accurate figures for these conditions, but whatever the answer may be, they contribute the main arguments advanced by proponents of reinforced plastic making for expendable tip and underwing fuel tanks to be total by our aircraft.

In addition to the point that the reinforced plastic material is non-critical, the arguments are that the plastic tank is lighter, cheaper, isn't affected by corrosion, with component parts of some types making for easy shipment for field assembly.

But, although it has been reported that somewhere about 500 million has been allocated for production of jet-suitable fuel tanks during fiscal 1955 by the Air Force, no reinforced plastic tanks have yet been approved for field production.

Some units, however, have passed qualification tests, with flight tests still to come.

British Change Lately—British military planners, it is reported, are steadily conscious of strictly observation and the scrap value. In the event, of jet-suitable metal fuel tanks.

It is likely that, within the very near future, a complete switch from metal to reinforced plastic expendable tanks may be mandatory for the Royal Air Force.

Advances West has heard.

Big Production Ahead—It is reported that Britain already is in large-scale production of reinforced plastic expendable tanks.

British Aerospace Co., Ltd., is turning out large quantities of reinforced underwing and tip tanks constructed of Duxton reinforced plastic. Duxton is a trade name for an aluminum type of reinforcement. It is reported to possess a top amount of toughness with this material.

Highspeed Shapes—The Hawker Hunter, can highspeed interception, is reported to have been fitted with reinforced plastic underwing fuel tanks at the top speed of the plane, indicating that the configuration could be carried into combat, at necessity.

Other developments in British reinforced plastic expendable tanks are used to include costs of such use and capacity as to dwarf anything else.

The British tanks, to a much greater extent than their U. S. counterparts, are

Zenith demonstrates field assembly:



1. ADHESIVE for center-sections bond guns on frame, Zenith.



2. HANGER BRACKETS are installed on top-edge skin.



3. SKIN EDGE is controlled with adhesive for making section.

tailored to high-speed flight conditions—some portions are sharper, tail sections have longer tapers.

Western Perfection Here—Companies engaged in development of reinforced plastic fuel tanks in this country include Zenith Aircraft division of Zenith Plastics Co., Pompano Aviation Corp., Mobile Products Corp., division of Admiral Distributors, Inc. and possibly others.

One of Zenith's developments is a 450-gal. fibrous glass-reinforced fuel tank, now awaiting flight tests at Wright Air Development Center. This is a Type 31 unit—a limited service (one-gallon) tank having a putting ratio of about 18 to 1. The tank is designed for assembly and bonding in the field. Minimum tank diameter is 24 in.

Forster's tank is a 200-gal. glass-

Typical tests for expendable tanks:



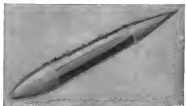
ZENITH tank (450-gal.) tank is stressed flight condition.



450-GAL. Zenith tank gets shock vibration test at Century.

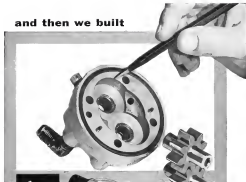


FASTURSH 200-gal. tank undergoes 15-ft. drop test.



ARTIST'S VERSION of Zenith 450-gal. reinforced plastic, expendable fuel tank.

and then we built



Nesting 10 Tanks

1. Nest 10 tail sections.
2. Nest 18 pin sections into the nested tail sections.
3. Stack 35 of the 20-ounce tin groups all two in bottom of each.
4. Stack one of remaining four frames on top of the first group of two at one end of the ends.
5. Place nested wire tail sections over the frames in proper supports.
6. Stack remaining three frames above end of tail section.
7. Stack the 35 container-section clear in groups of 15 each above the nested wire tail sections.
8. Nest eight of the 80 boxes into the ends of the tin sections.
9. Then remaining two boxes vertically, one on each side of the tail section.

Characterized Type III unit, an extended-service tank, just expendable, but not replaceable in emergency, which is completely assembled for maintenance as the aircraft, and recognizing inspection and repair personnel. Inside diameter of the tank is 21 in. It too is meeting light endurance tests at Wright-Patterson AFB.

Model Product tank is a 223 gal. unit. Reports are that this tank originally was designed as a Type II unit and was changed later to a Type IV tank, a limited-service type completely assembled at the factory. This unit also is reported to be in its final testing stages at Wright-Patterson AFB.

Advantages. Some of the main reasons are advanced for the use of standard plastic petroleum fuel tank:

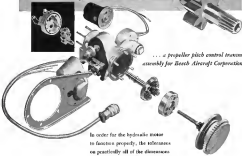
- Weight is saved. Ready for use, a 44-gal. monofuel-plastic petroleum fuel tank weighs 175.5 lb. as 630 lb. / gal. of usable fuel capacity, according to Zenith. The figure for the lightest 44-gal. unit in metal, Zenith says, is about 391.3 lb.
- No salvage value occurs to the owner when plastic tanks are refilled over its lifetime.

• Comparative costs. Estimate for the 44-gal. tank in monofuel plastic, including 13 plumbing, weight was about \$150 for production quantities of 5,000 10,000, according to Zenith. A 450-gal. metal unit, it is said, may run anywhere between \$175 to \$300.

• Material is good. The plastic material is resistant to corrosion, salt water, fuel, oil, acids and even caustic fluids. Zenith reports that its tank withstands high humidity and temperature ranging from -61°F to 161°F.

• Minimum leakage. Tanks are sealed with a flexible bonding material which penetrates cracks and fissures for tank leakage, also providing the strong

... a propeller pitch control transmission assembly for Beech Aircraft Corporation.



In order for the hydraulic motor to function properly, the references on practically all of the dimensions had to be held to within .0001" or .0002" for squareness, parallelism and concentricity.

INDIANA GEAR

INDIANA GEAR WORKS, INC. • INDIANAPOLIS, INDIANA



NARCO DME PRODUCTION INCREASED

Many Aircraft Now Equipped With Distance Measuring Equipment as CAA Completes DME System

With DME fully operational at 245 VOR and 315 now along all the major arteries of the U. S., pilots of hundreds of DME-equipped aircraft are already enjoying the benefits and advantages of accurate, safer, more economical IFR and VFR operations.

Rapidly Approaching Procedures

DME is giving these pilots positive continuous position indication enroute, far ahead of the FAA's previous with minimum indication. Now, approved DME in-use procedures are setting many pilots' old approach time normally again.

When on final or local most favorable winds shift by checking ground speed accurately with their DME. They are saving money, getting there quicker and approaching with far less stress than they have had on board.

General Increases for Narco DME

As one pilot with confidence, the demand for DME is an essential piece of equipment for safer IFR operations has resulted in increased production of the Narco DME, the only DME on the market with an unobstructed CAA Type Certificate for service use.

The Narco DME is proving superior in every important aspect for reliability, accuracy and service use.

Crystal Controlled

Narco DME is the only one which is built by positive crystal control. It is lightest in weight and requires less power. It uses the most advanced circuitry and proved wiring to save space and weight. Twelve new ARINC rugged design for long life. Its internal construction permits quick disassembly.

The Narco DME is the first of the new Narco Supra line of air transport type equipment of latest possible quality.

TWO-SCALE INDICATION



Nation-wide Narco DME Service

To assure users of perfect operation of their DME, Narco has established a complete nation-wide service network. The radio service companies listed below are certified with Narco factory-trained personnel and have complete DME test and service equipment:

American Radio Co., Tulsa, Okla.
Aircraft Communications, Inc., Cincinnati, Ohio
Aircraft Electronics, Inc., Chicago, Ill.
Aircraft Electronics, Inc., Dallas, Texas
Aircraft Electronics, Inc., Denver, Colo.
Aircraft Electronics, Inc., Fort Worth, Texas
Aircraft Electronics, Inc., Houston, Texas
Aircraft Electronics, Inc., Kansas City, Mo.
Aircraft Electronics, Inc., Little Rock, Ark.
Aircraft Electronics, Inc., Miami, Fla.
Aircraft Electronics, Inc., New Orleans, La.
Aircraft Electronics, Inc., Oklahoma City, Okla.
Aircraft Electronics, Inc., Omaha, Neb.
Aircraft Electronics, Inc., Phoenix, Ariz.
Aircraft Electronics, Inc., Portland, Ore.
Aircraft Electronics, Inc., Salt Lake City, Utah
Aircraft Electronics, Inc., San Francisco, Calif.
Aircraft Electronics, Inc., Seattle, Wash.
Aircraft Electronics, Inc., St. Louis, Mo.
Aircraft Electronics, Inc., Tampa, Fla.
Aircraft Electronics, Inc., Wichita, Kan.

Write for brochure on Narco Model 2042

FIRST OF THE
narco Supra LINE
NONE BETTER

narco
NATIONAL AERONAUTICAL COMPANY, INC.
CHICAGO, ILLINOIS



Side view of bomber shows clock face. It is first production aircraft to have an elevated ambient temperature for electric system.

Latest Air Force bomber has new G-E engineered power-generating electric system

NEW GENERAL ELECTRIC ENGINEERED SYSTEM MEETS DOUGLAS B-66 OPERATIONAL DEMANDS FOR HIGHER AMBIENT TEMPERATURES

A new a-c power-generating system has been developed by General Electric, and is now operating on the Air Force's newest light bomber, the Douglas B-66. The system consists of three major components: high efficiency alternators, static voltage regulators, and generator control and protective panels.

DESIGNED FOR HIGH PERFORMANCE AIRCRAFT

With a generator that can operate at high ram-air temperatures of high speed flight, the new G-E system is designed for long life and reduced maintenance time. Its static voltage regulator has no moving components to wear out, and under laboratory testing it has withstood 5000 hours of operation without maintenance.

Regulation is precise, and requires no pilot adjustment of voltage or load division. The control panel replaces the substantial control of start-up, shut down, and maximum

protection against ground faults, over and under excitation, and zero phase.

SPINS TAKE-OFF, SPARES PILOT

The new equipment begins operating as soon as the pilot starts the engine. The system controls only two toggle switches, which may remain "off" at all times, even when a fault develops. This automates a series of pilot functions and sharply reduces the time required to become airborne. Under normal conditions, fault clearing and resetting are fully automatic.

SINGLE SOURCE FOR COMPLETE SYSTEMS

General Electric offers a single source for complete a-c or d-c power generating systems and constant speed drives for most aircraft. For more information, contact your nearest G-E aviation specialist, or write: Services 314-56, General Electric Company, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL  ELECTRIC

Static regulator (left) maintains constant alternator output voltage. Control and protection panel (right) helps hours and builds faulty generator.

New G-E high-efficiency a-c generator has an inherent over-voltage protection built into design and is high speed aircraft.

Tests of system showed better protection against over-voltage, over and under excitation, ground faults, anti-rubbing, efficiency control, and open phase.

Douglas B-66 takes off at Long Beach, California, for its test run. Its electrical system was designed by G-E to operate in ambient temperatures as high as 80° C (176° F).

GENERAL  ELECTRIC



AERO COMMANDER CHOOSES OKLAHOMA



R. T. Smith, Jr.
Aero Design & Engineering Co.
President, Tulsa

We chose Oklahoma because of a combination of factors: necessary physical facilities, a ready and interested labor supply, a stimulating economic climate, and a climate favorable to production. All this, plus a CENTRAL GEOGRAPHIC LOCATION makes us CHOOSE OKLAHOMA.

AERO Commander

FOR FURTHER DETAILS...

These are favorable factors will

make you in having a more profitable operation in Oklahoma.

Write to the Oklahoma Planning and Economic Board for complete

information regarding the aircraft industry in Oklahoma.



Famous Aero Commander Twin Engine Airplane ... Made in Oklahoma Used All Over the World!

Aero Design and Engineering Company, makers of the world renowned Aero Commander, selected a chosen plant site in the heart of the nation when they moved to Oklahoma. Their prime requisites included a central location to eliminate long leads on supply and delivery, a receptive community, a large, willing labor pool with a good mental attitude toward production, and a climate suitable for the overall economy. The Tulsa Airport area, near Oklahoma City, filled all requirements and is now their permanent production site.

steps. Here are the simple, proved steps in the assembly of the 450 psi plastic tank in the field.

- Forward and aft frames are bolted to the longitudinal beams.
- Hanger brackets, assembled with studs, are inserted through bracket pads, pins and top center-section disk.
- Beams and trusses are bolted and bolted to ends of center section disk, and carbon pad is installed.
- Lower center-section skins (oval) are bolted to each other and to upper center disk sections and to the fuselage. Straps secure the bolted joints.
- Plumbing is installed in the center section.
- This piping includes the fuel outlet and the pressure vent assemblies.
- End sections (nose and tail) are assembled to the center section in the future. The tension rod is inserted through the complete assembly from nose to tail. Nose rod end cone nut is bolted to the center section and held in place by nuts on the tension rod.
- After band has cured, tension rod is tensioned. Straps are inserted in the tail holes and bolted in place.
- An Alcoa Professor-Zenith tank is designed to use the air-blown process system. Here's how it's made:
- In the plastic operation, strands of glass fibers are fed into an automatic chopper for cutting to short lengths. The chopped strands are blown into a perforated chamber where, by partial vacuum, they are collected on a metal screen having the shape and size of the part to be molded. At the same time, a quick-drying binder is sprayed on so that the material will hold its shape.
- After desired thickness and density of fibers is obtained on the screen, the screen with perforations is placed on an oven. Heat quickly cures the binder, cementing the fibers so that the perforations may be taken off the screen and handled without losing its shape.
- Petroleum is placed in the oven. Liquid polyester resin is poured into the perforations, and made part of the die is brought down for molding. Stems heat and pressure causes the resin to flow through the fibrous strands, swelling and curing the perforations into a strong, lightweight shell. After about three minutes of heat and pressure, the die is opened and the molded part removed.
- Placed in a shank fixture, the molded part cools to precise shape and dimensions.
- A finishing fixture is used to remove flash and excess material.
- No painting or treatment of the tank is necessary unless it is desired to make the tank porous resistant to rain erosion by coating it with material which has microbubbles built into an adhesive. Installation of metal fittings and attachment parts complete the components of the tank.

VISIBILITY by Swedlow

IN THE H-1 HILLER RAM JET HELICOPTER



The Hiller H-1 helicopter

is powered by the first ram jet engine in the U. S. to receive C. A. A. certification. It's notable for its large transparent canopy, with the unusual visibility required for its large variety of missions, including training, liaison, reconnaissance, aerial photography and command. The H-1 canopy is an outstanding example of the optical perfection of Swedlow produced components in transparent glazing materials. For specific applications, contact the Swedlow plant nearest you.

Swedlow
PLASTICS CO.



Map shows major routes of these 18 Super Constellation airplanes

Figures represent actual number of miles flown for each airline

- Air France 541,000
- Air India 400,000
- PAN AM 300,000
- British Overseas Airways 211,000
- Eastern Airlines 171,000
- Delta Air Lines 141,000
- TWA 131,000
- Lufthansa 121,000
- Northwest Airlines 111,000
- Pan Am 101,000
- United Airlines 91,000
- American Airlines 81,000
- TWA 71,000
- The Atlantic Flying Service 61,000
- TWA 51,000
- TWA 41,000
- TWA 31,000
- TWA 21,000
- TWA 11,000

Every month another airline starts Super Constellation Service

To you this means that soon you can fly more places faster, in greater comfort than ever before... on big, fast, beautiful transports that are world renowned for dependability. Lockheed Super Constellation... new with turbo-propeller power.

Already more new Super Constellations are being built in volume order than any other comparable air transport... ordered by more than twice as many leading world airlines. So many, in fact, that every month during 1946 a different airline started Super Constellation service. This month it's increasing to 18.

Many world airlines (18) have ordered the Super Constellation. This is an exceptional transport—worth remembering and favoring you.

Lockheed

AIRCRAFT CORPORATION
GLADYS, CALIFORNIA AND WASHINGTON, DISTRICT OF COLUMBIA
Look to Lockheed for Leadership

When you make hollow parts...

**Start with
seamless tubing**



**instead
of bar stock**

Save steel, machining time!

When you make hollow parts from bar stock, you waste time boring the center hole—you waste steel because you have to throw away the chips you bore out. Why not do it the easy, economical way? Start with Timken's seamless tubing. The hole's already there! Finish drilling is often the last production step. You're machining time—get more parts per ton of steel.

With Timken seamless tubing, your machine tools are more productive. Screw machines instantly used for drilling are no longer needed for other jobs. You get added machine capacity without additional machines.

To make sure you save even more steel, our engineers

will study your problem and recommend the most economical tube size for your hollow parts job, guaranteed to close up to finish dimensions.

You also get the highest material quality with Timken seamless tubing. The peening process by which it's made is basically a forging process. Results: a uniform grain flow for greater strength and a reduced grain structure which brings out the best quality of the steel. And the Timken Company's rigid control keeps the quality uniform from tube to tube and from heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton, 6, Ohio. Cable address: "TIMKENCO".

SEAMLESS TUBING • CARBIDE COATED DRILL BITS • TOOL STEEL



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

PRODUCTION BRIEFING

► **General Electric** has announced that the Douglas A320 Skywest two jet X-ray loader will be built by Western Ship Industries, Hayward, Calif.

► **Accessory Products Corp.**, maker of primer regulators, valves, filters and oiler products, has opened a \$65,000 addition to its Watertown, Calif., packaging plant facilities by about 9,000 sq ft.

► **New credit line** suggestions and ideas adopted is expected to be set by employees of Boeing Aerospace Co., Seattle, for 1974. Up to November, management had adopted 1,886 suggestions, more than 700 above 1973, while needs totaled nearly \$10,000, approximately \$5,000 higher than 1973.

► **Kaman Aircraft Corp.** has opened a new 25,000 sq ft light test bays at Haverhill, Mass., which includes research labs, experimental shops and test and development engineering facilities.

► **Columbia Machine Products, Inc.**, Brooklyn, N. Y., machine and engine components outfit, has completed a \$750,000 facility expansion program and assigned sales offices at Jackson New York New Jersey, 1815 W. 28th St., Philadelphia, N. J., Atlantic Southwestern New England, Denver, 5641 Division St., Philadelphia, Malvern, Malvern sales office at Lancaster, a contractor.

► **USAF** has unveiled helmet styles for jet crew members from cockpit-to-ear to strengthen plastic visors and green anodized metal for 2,500 of the new helmets to be built by Ray Co., Pittsfield, Ohio, at a price of \$12.45 each.

► **F108 wing spars** will be built at Soledad, Calif., by General Motors Corp. The wing has been a subcontractor in doing B-12 and Republic P-44 and P-44G.

► **Decodon Corp.**, Boston, maker of precision instrument and control equipment, has been purchased by Minneapolis-Honeywell which will operate it as a new division.

► **Kolchinsky-Fulmer Controls Co.**, Greenwich, Pa., has received its American Division (the American Division) from the California Division products line. The California Division products line has 70 different divisions for civil and military planes and ground vehicles.

► **Allenworth, Inc.**, Appleton, Wis., has announced that it has received a contract to provide the U.S. Air Force's helicopter and passenger controls. Agreement has

been approved by State Dept., which also approved another licensing agreement between Allenworth and Rockwell International, Inc., which is under development on turbine engines and rotor blades.

► **Kaiser Metal Products, Inc.**, Baiton, Pa., has been awarded a contract by an unnamed engine firm for fabrication and assembly of a number of integral stainless steel sheet metal jet engine components. It is not a production job, but a prototype for quantity orders made, a Kaiser official notes.

BuAer Contracts

The following contract awards of \$13,800 and more have been announced recently by the Bureau of Aeronautics, Department of the Navy, Washington 25, D. C.

TEST EQUIPMENT CORP., Cleveland, 8, has been awarded a contract by the Bureau of Aeronautics for test equipment. \$10,000.

ROBINSON ENGINEERING CO., Cedar Rapids, 10, has been awarded a contract by the Bureau of Aeronautics for test equipment. \$10,000.

ATKINS ENGINE CORP., Cedar Rapids, 10, has been awarded a contract by the Bureau of Aeronautics for test equipment. \$10,000.

SHERRILL ENGINEERING MANUFACTURING CO., St. Louis, Mo., has been awarded a contract by the Bureau of Aeronautics for test equipment. \$10,000.

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**WE'RE
LOOKING FOR
ENGINEERS
WITH
ABILITY**

Stratos—now developing new air conditioning systems, air turbine drives, controls and other pneumatic accessories for aircraft and industry — is interviewing well-qualified men as

RESEARCH ENGINEERS

For investigation and studies in pneumatic instrumentation and very high speed power systems.

PROJECT ENGINEERS

Specialist — Instrumentation and Design.

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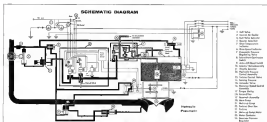
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THE TURBO-HYDRAULIC POWER PACK was custom of its kind from direct oil engine compression, to produce hydraulic power.

Remote Packs Provide Hydraulic Power

A new approach to furnishing power for aircraft hydraulic systems is being evolved by Jack & Horvath. Materializing at the T30 Turbo Hydraulic Power Plant, the concept stems from a development contract given by Boeing for design of a pneumatic-driven hydraulic power source for a plane such as the eight-engine B-52 bomber. In the B-52, ten of the pumps would be inoperative.

Three of the units have been built and are under test.

Skiff's approach is to locate the power packs separately from the power-plant (four each in fuselage and wing, two in the tail) and to make each set completely self-sufficient.

► **Powerpack to Hydraulic**—The pack's job is to convert pneumatic energy into hydraulic energy. That is done by using compressed air from the plane's PTU (pressure transfer unit) sections to the TH3's pneumatic side where an air turbine drives a pump to supply power to the aircraft's hydraulic system. Pneumatic side of the power pack was developed and is being supplied by Stator Division of Fairchild Engines & Auxiliary Corp.

The THL is capable of an off operation and it wraps all of its components up in one, neatest package.

The on-off instant provides an economy. As to drive the units is blind from the engine only during the comparatively infrequent periods when hydraulic power is required about the plane. So, the engines are topped of power for only a fraction of the flight.

duration. This in turn is translated into more economical fuel consumption, which means greater range or increased payload. In addition, three periods of different surface wear on the packs. However, the packs can be operated continuously, if desired.

Wrapping up all hydraulic and pneumatic components into one package

means shorter lists, both hydraulic and pneumatic, between individual units, resulting in weight saving. And having overhead weather vane gear.

Another feature, important from a logistics and maintenance standpoint, is that each of the 10 power ports is designed so it would fit into any of the 10 locations aboard the B-51, for instance, without modification.

- **THI Characterizes Jack & Hanita engineers outline these characteristics for the power pack.**
- **THI has operated successfully with input at 151 psi and 760F, conditions occurred by the JET.**

- Making pump and motor not bolt integrally into the pack, using weight through the transmission of hydraulic lines between pump and pack and shortening power lines

• Main hydraulic pump of two different manifolds may be used with the pack because design makes possible for such a configuration.

- Internal components of the assembly, including the makeup pump, are all accessible by removing the cover.
- A custom machine is designed for

* Turbine position is adjustable. The
twin is fixed and a heat shield is
placed between the turbine and gas
line. Also a small "flue" is vented.

bers. Also a small "fan" is mounted on the turbine drive shaft to help in cooling. This eliminates any requirement for supplemental blowers to supply cooling.

• Turbine gearbox is lubricated with MIL-L-7808 oil. Since this is the same oil used in the PTZ, location and serv-



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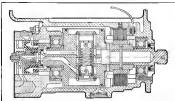
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Torrance, California



WHEN TURBINE reaches 5000 rpm, governor speed control (center) and compound governor (right) take over. Operation is described in more detail below.

left, thermal control and various relief valves are integral with the governor. The governor main assembly runs freely, among other things, the governor heater and two thermal switches. Switches are act at -200 and zero, respectively, to provide normal and over-heat protection.

• **Ball valve.** JAH says that Statco engineers developed a highly sensitive ball valve which prevents negligible resistance to air flow in the open position through a 2.25 in. bore and provides extremely good sealing characteristics when in the closed position. Leakage rates are far below specifications requirements. Statco has been awarded an R7 in research at various engine bleed conditions to reduce engine bleed air leakage losses to a minimum.

A carbon and having a polished, control seal carrier line control with the ball, while a stainless steel bellows

provides noncontact sealing. The ball valve is positioned by the ball valve actuator through a rack and pinion.

• **Governor speed control assembly.** This unit, also developed by Statco, is made up of two basic parts: a metering air valve and a permanent magnet overpowered governor.

The metering valve controls speed of the turbine by positioning the throttle. Action of a rotating piston against a spring in the center of the unit performs the function by restoring air to the throttle actuator. Unit begins to function when the turbine has reached about 90% of rated speed.

On a common shaft, the overpowered governor "provides a signal to the frequency-sensitive amplifier which drives the overpowered valve to function."

• **Makeup pump system.** This system reduces water in superheated, jet



EXPLODED VIEW down to low and gearbox components of YH1 Inducta power pack.

cooled and operates on 260 v. 3-phase, 400 cycle current. Unit develops 1.2 hp at full load speed of 2,600 rpm, at 15,000 ft altitude. The motor has relatively flat speed torque characteristics which allow pump loads to vary without appreciable effect on operating speed.

Motor starts each under load and reaches rated speed quickly because starting torque and maximum torque are of about equal magnitude. Motor draws pump through a 4.5:1 speed gear train.

• **Turbine and gearbox.** The steel turbine wheel is a ball-balanced, solid, 10-inch wheel mounting 10 main blades and 10 short blades alternately. The turbine is made of heat treated, chrome-nickel alloy steel to meet stress and is assembled in an integral part of the stainless steel valve. Nozzle has 27 axial entry passages giving a total area of 1.53 sq. in.

The gearbox is made up of double-reduction gears. First pin has a ratio of 53:17, the second 20:65, giving a total reduction of 16:1:1. Thus a turbine speed of 50,000 rpm. gives a pump speed of 1,750 rpm. A gear type oil pump lubricates the unit.

JAH says that it intends to relocate the overpowered governor so that it actually senses turbine shaft speed instead of rpm of a shaft in the turbine gear system.

OFF THE LINE

Dallas Aerospace, Inc., has been awarded an unlimited Class I power plant rating to develop engine engines by the Civil Aeronautics Administration, the company announced. Dallas Aerospace already has a Class II approval certificate which covers engines from 425 hp up. The Class I license is for engines with horsepower up to 450. The aerobal firm is currently testing out some 500 engines in month for USAP, CAA, corporate aircraft owners, and several airlines. Company also develops engine engines. Address 6141 Forest Park Road, Dallas.

Silicone rubber gaskets, developed by General Electric, is being used as door seals on USAP H-21 Pavee's left engine because of its ability to withstand wide temperature extremes according to GE. The product, called SE-556, can take temperatures ranging from -120 to 500 F. GE says SE-556 also has resistance to stress and corrosion encountered at high altitudes, will not cause doors to stick under acidic gas permeation; withstand shock and aging. The material is being extended into Pavee door seals by Paving Rubber Corp., Irving, N. Y.

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BOSHAMBA test rig engine shown.

Portable Master Clean Cylinders on the Plane

A Hiler UH-128 helicopter reportedly showed approximately 15% increased power and climb performance after its engine was treated by a new portable blast cleaner that sprays a vacuum chamber and other foreign deposits without the need to dismantle the cylinders. The new device is called the Aero Power combustion chamber cleaner.

Operated solely by air pressure, the cleaner blasts a non-corrosive non-abrasive agent through the air of the cylinder's spark plug ports, scavenged deposits are blown out through an outlet hose attached to the other spark plug port and captured in a disposable filter bag.

Via Diesel Aircraft Supplies, Eter (also, N. J.) (also Minneapolis, Washington, D. C. and Boston) is distributor of the device.

Three Small Motors for Serrins, Mixtures, Controls

A trio of fine electric motor mixers just over an inch in diameter is being offered for use in guided missiles, autopilots and other control functions. The three:

- Servo-gear motor, weighing about 40 oz. and measuring 1 1/4 in. diameter by 2 1/2 in. long, is adaptable to guided missiles, autopilots, instrumentation and control devices, the milky name. It operates from 115 v., 2-phase power; frequency is 400 cycles, no-load speed is 180 rpm., full-load 150 rpm.; gear reduction is 28:1. It is constructed with Modiconite, includes bronze-invar-chronium and capacitor-reduction air seal at various voltages and frequencies. Ruckless Air Devices, Inc., 190 Central Ave., Dover, N. H.

- Type SC is a 400 or 60-cycle a.c. motor, designed to exclude problems for military environmental specs, can read-

ily be modified to meet a wide range of applications, the manufacturers note. It can be wound for single, two, or three phase, and can be bracketed as an induction or hysteresis motor. Also available with a concentric type gear system.

Globe Industries, Inc., c/o Yale J. Hart, 1754 Smiley Ave., Detroit, Ohio
• Permanent magnet d.c. motor, Model 16251, is designed as a drive for servos, cams, valves and similar applications. Weight is 54 oz., diameter is 1 1/4 in. and length is 2 1/4 in. Case can diameter is 1 1/4 in. and mounting flange has 2 1/2 in. diameter. It is designed for 30 to 30 v. and has an output speed of 410 rpm. Maximum torque load of 4 rpm. is 50 in.-oz. Case is aluminum alloy with plastic molded brush lead out. Ball bearings are sealed and ground for wet life.

RB Motor Co., North Hollywood, Calif.



DEDICATED unit weighs in at 14 lb.

Dryer Prevents Fogg Of Bombight Lens

New desiccant system circulates and dries air in bombight lens dries to prevent fogging of the lens.

The model BJA-3000 desiccant unit dries a 317-oz., 400-psi cartridge pump unit and two desiccant jars containing anhydrous calcium sulfate as drying agent. The calcium sulfate frame pack, which it is saturated and changed, is replaced.

The desiccant unit weighs 14 lb., it is corrosion and fungus resistant. Lee-Kemper Div., Lee, Inc., Kyrin, Ohio.

Battery Maintainer Adjusts Charging to Temperature

A new battery maintainer which automatically compensates for temperature variations has been developed by Rite Products Co.

The unit, labeled the C-18 Voltage, incorporates an electronic sensing ele-

ment which determines the battery's discharge rate and automatically adjusts its charging current to the proper rate regardless of temperature changes.

The unit has the following specifications: in range in five 12 v., ten 6 v., or thirty 3 v. batteries; C-10's output: 110 v., 50 c., 1.5 amp.; output: 167.0 milliamperes over a temperature range of 0-200° F. Weight is 5 lb., size is 10x2 1/2 x 5 1/2 in.

Address: 4720 N. 10th St. Portland, Oreg. 97217.

ALSO ON THE MARKET

Rapra's polymer seal is now available for use in hermetic sealing of glass-to-metal joints, except combustion chambers, gas turbine control plugs, turbine blades, etc. Rapra's is made by a new process, and is made in approved mechanical characteristics. Wrap and weld strands of layers of woven non-cloth are welded together, then molten seals are welded to produce a hermetic seal with a seal life exceeding that of the original material but retaining its uniformity. Aircraft: Penney Media, Inc., 20 So. Cliff Ave., Glen Cove, N. Y.

Lightweight hydraulic motor, designed and tested to MIL-M-7097, is suitable for operations to 6,000 rpm and 3,000 psi. Employing only four bolts in cast aluminum, valve utilizes a permanent balanced carbon seal. One model weighs 7 lb. and develops 148 hp.—United Hydraulics, Inc., 110 Turret Court, Dayton.

Ten-Ton tracing units convert also laser millers, planers and other cutting tools to modern, high-production, high frequency machines capable of heli following templates as their diameter.—Inland Machine Co., Ft. Meade, Calif.



Two-Way Torque Tool

New torque tool, shown left in right torque, while previous equipment of this type assumed right only, counteracts any. The tool has interchangeable bits too, so it can be used as a torque screw driver or nutrunner. Make a Apex Tooling Co., Ashburn, Mass.

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WOULD DOUGLAS TELL NORTH AMERICANS? Some observers say orders of \$40, for instance, would be virtually irrelevant in the event of new planes to various aspects of possible competition, such as NAA. That's one factor in assessing industry's aviation expansion.



Avionics-Airframe Industry Dilemma

When Is Your Customer a Competitor?

By Philip Kins

Despite the aviation industry's fascinating capability in the avionics field, several powerful forces appear likely to set in a hole upon these avionics companies that are anxious to expand their avionics activities.

Some of these factors exist to light in Avionics Week's discussions with officials of seven major manufacturers of avionics systems, all of them outside the aviation industry.

Two of these officials are at better than they are through discussing details of their new developments in one particular avionics manufacturer (which has a strong avionics group). In fact, these officials say that two companies have no intention of even attempting a joint program with the aviation manufacturers on their future needs.

► It's This Feeling Spreads: If this behavior were to spread to other avionics manufacturers, the aviation companies in question might find their avionics equipment in question might find their avionics equipment. This could jeopardize the overall effectiveness of its future efforts.

Several avionics manufacturers hope to take more out of collective action through their Radio Electronics Television Manufacturers Assn. It is reported that RUTMA may ask the Defense Department to act to encourage further avionics expansion within the aviation industry.

However, even the officials most disturbed by the trend emphasize that, in most cases, they thoroughly approve of the idea of selling their avionics systems directly to aviation companies, where the industry is doing. In fact, many appear to prefer this new approach because it greatly simplifies the integration of avionics and avionics systems. What the larger avionics systems firms do object to is the increasing in needs of some avionics companies themselves into areas of R&D and manufacturing, Avionics Week's avionics industry.

► Why Does What the Whom?—One major factor reinforcing further in

Avionics Week's avionics expansion stems from the present situation, which some avionics manufacturers describe this way: "When we call on others as our customers, we are not sure whether we are selling a customer or a competitor."

As a result, this manufacturer is reluctant to disclose full details of new avionics details, which an avionics supplier may partly need to evaluate competitive avionics systems for its own airframe or avionics products.

However, the avionics for another major avionics firm says that it does not see new avionics, but recognizes that it is "taking a calculated risk in doing so."

The problem first faced its head on a major avionics firm when it was a USAF competitor for an advanced intercepter. At that time, North American Aviation, General, and possible other avionics companies submitted proposals on both the avionics and the airframe. In pre-conference discussions of their ideas, several avionics manufacturers reportedly played their cards close to their chest when they knew the avionics company was planning also to go after the avionics business.

► Four Looks—Avionics activities in North America are centered in a core avionics systems division, Mission and Control Equipment (MACE), which is several orders removed from the avionics operations. This probably represents in part a physical separation

at coast anywhere in the industry. Yet several avionics manufacturers told Avionics Week that even under these favorable conditions, they feared that new ideas, disclosed to avionics people, would leak back to the avionics people's group. In fact, spokesmen for two avionics firms disclosed to Avionics Week that they believed that had happened at one unclassified avionics company within the past year, and both were quite bitter about it.

If such a leak occurred, it might have been inadvertent and innocent in intent, without explicit leak-back or consent.

For example, suppose that a avionics manufacturer A had proposed to an avionics manufacturer B a new air control system which at current would have been the target of serious work. An avionics person would logically ask for a similar system proposal from their own avionics group.

If A's avionics group proposed a system with only conventional avionics, the avionics people would tell it that outside competition had proposed a set with twice the range. When A's avionics group denied that such performance was possible, suggesting that the avionics people were victims of superconformity, it might cry on the latter to disclose sufficient details of A's proposal to prove that the new system would indeed perform double the normal range.

At that point, the cat is out of the bag.

► Could Builders—Most of the avionics companies with large avionics staffs engaged in R&D view their own as a source of coming up with a better performance, better integrated avionics system. However, this could include if avionics manufacturers begin to move closer to airframe firms as competitors, leaving them with a single source of avionics systems—no avionics company left to be depended upon, a side effect, even if avionics firms find it.

If an avionics manufacturer were to find itself shunned by the avionics systems industry generally, the overall quality of its avionics might suffer in the long run. And most avionics com-

Turnabout?
Despite the well-known avionics expansion programs which Collins has carried on in recent years, only for the avionics of its Douglas M-1000, an avionics spokesman dismisses any intention of their moving into the avionics business. Since Collins has no known avionics program of its own, the program has been considerable years later.

Lippincott, avionics activities in avionics and avionics are possible and designer of General's World War II avionics avionics. The US, a known avionics, is hardly interested in being an avionics with its avionics people. A recent avionics Collins contract with the US of North America may be devoted along these lines.

Avionics actually have avionics (avionics or avionics) in their avionics product.

► Tough Sell Outside—Another factor which may restrict avionics expansion activities in the avionics field is the avionics people's reluctance to work with a customer who is also an avionics supplier.

This is particularly serious for avionics such as avionics flight control and the avionics system. The result is that the design and integration of these avionics with the avionics avionics that the avionics avionics have access to consider avionics on new avionics configurations and performance.

In the last stages of avionics development, this is a situation which an avionics company is naturally reluctant to give another avionics group, particularly if the latter is a competitor in the avionics field of avionics. In fact, avionics manufacturers are sometimes reluctant to divulge such information as to avionics avionics know the fact of well find its own avionics competitive avionics.

United Aircraft originally faced a similar problem with its Pratt & Whitney engine and General Electric's

from avionics, out of the avionics which proposed R&E to set up CVA as a separate avionics unit last year.

This suggests a possibility for avionics companies who are anxious to expand their avionics activities without jeopardizing their avionics business. However, the avionics avionics are at variance of having both avionics and avionics under one corporate management, overall avionics.

► Douglas Develops—When North America (and its avionics avionics) expanded Douglas Aircraft Co. to sell a new NAA/MACE avionics system for a new plane, a top Douglas avionics avionics avionics to consider the avionics avionics of NAA's competitive avionics position, Avionics Week was told in good avionics.

On the other hand, Navy B-1 has authorized the NAA/MACE avionics for use on a new McDonnell avionics avionics. It remains to be seen how the avionics avionics will

It was with this basic problem in mind that an Air Force official told Avionics Week that if Douglas Aircraft Co. (which USAF avionics avionics avionics) must not sell, but personally involved it would go to an avionics avionics.

► Tough Sell Inside—An avionics company's avionics group does not always have as many avionics avionics within its own firm, at least in present. The avionics people are always reluctant to risk the success of a new avionics avionics avionics avionics or avionics.

North America's MACE group is known to have been a contractor, along with Massachusetts-Hawthorne and Lear, to build the avionics for the F-100 MACE reportedly has dropped out of MACE control for reasons to require avionics avionics avionics avionics the F-100 avionics. However, MACE, presumably has had relatively little experience with large-scale production of such avionics, whereas M&H and Lear have built thousands of avionics.

It may be assumed that if NAA's avionics

MARKED CONTRAST between avionics supplied for production of avionics and avionics is shown in these two General Motors. Avionics one (below) takes two units to operate





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tion, people had reacted fairly upon use of a MACC-designed autopilot, the Air Force would probably have gone along. The fact that MH got the nod for the F-100 means that NASA's aerospace people did not go to such lengths, and also suggests that they may have been reluctant to ride in on that issue. However, that is speculation.

► The Production Executive—It was written of prototype engine component turned out by NASA, Ames, General Motors, and other aerospace firms indicates that their fabrication techniques are as advanced as they can be found. (Because of security, it is impossible to evaluate the all important quality of current design.) However, there are some in the aerospace industry who question whether the aerospace people can bridge the gap between prototype and large scale production without serious difficulty.

One observer says it up this way: "Too many aerospace people in the aircraft companies think that the job is a piece of cake when they build an aerodynamic component that works. Actually at this point the job is a lot more difficult."

It is interesting to note, however, that some observers in the aerospace industry were saying the same thing in 1945 about Hughes Aircraft Co. MACC successfully got over the large-scale production hurdle, but as to doing itself out of the aerospace business.

► Landing Production Problems—Contra was one of the first aircraft firms (not counting Hughes) to set up an on-site test cell engine production, with its Contra engine program for the Navy. Its success suggests, it was a very prolonged and painful testing process.

However, Contra expects to profit from its Contra experience. It also hopes to prove the ability for future engine production in the production line which it has set up in its San Diego experimental factory. The company is currently building an advanced search engine on this line.

Contra says it has installed the very latest production techniques for everything from stocking raw materials to final inspection. Information gained here will be applied to setting up similar lines in other locations.

► Lot of Differences—Aerospace industry engineers claim that in a whole of a lot of differences between building as planned and as built. For example, look at the difference in size of the two Contra's engines, one used in airplane fabrication, the other for aerospace operations shown on p. 37.

They observe that even the kind of organization (project-type) which used in the aerospace industry, is

No Names, Please!

To many aerospace manufacturers, some aerospace companies are both customers and competitors.

When Aviation Week asked officials of seven major aerospace firms for their frank comments on the problem, it was with the intention that neither they nor their companies would be identified, but it is possible that some of these companies are competitors.

not best suited for an aerospace operation.

It is interesting to note that Contra has developed a new hybrid project group type of organization at its Pomona engine plant, which does considerable money work. The problems at Contra in building engines, and the way to build on previous, were described by Charles J. House at the recent Western Electronics Convention (WESCON) in Los Angeles. House is a general manager of the Pomona plant.

Working in modern aerospace company has been a struggle in aerospace, which has recognized its engineering staff doing similar jobs (Aviation Week No. 21, p. 19).

► WSM: Limitations—To permit aerospace manufacturers with weapons system management type contracts from using them to make contracts into established systems (and what industry does), USAF wants the following type of change in its WSM contracts.

"The contractor is not hereby approving any increase in the cost of its normal manufacturing functions. However, the contractor expects and expects the contractor to increase its management functions as required in assuming overall responsibility for the various systems involved."

The intent is to indicate that USAF will not approve a WSM contractor's request for government financing of new production facilities if they are located in overseas lands.

However, with most aerospace firms already in the aerospace field, very few aerospace industry people find much cost in such a contract. They also find that aerospace companies brought in to produce the "management function" will sooner or later find their way into R&D activities.

► Aerospace Industry Reaction—Aviation Week's talk with officials of the two aerospace companies has led to their reactions to the present state of affairs, predicted events raising the point from "business concern" to "we were much more concerned 5-12 months ago, but now think the band is reversed." All on an aerospace inter-



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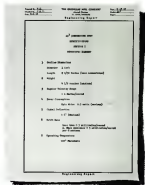
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viewed indicated a keen awareness of the problem and that indicated that they were giving it considerable thought.

Officials of aircraft firms that had recently represented closed competition from aerospace companies were naturally the most alarmed. Officials of companies whose fields had not yet been invaded by the aerospace manufacturers were less perturbed. In fact such assurance, the official shared most concern over the potential threat rather than the immediate one.

■ **What Are They Doing?**—A question as to what these aerospace companies intended to do to conquer the threat brought these kinds of answers:

• **Developing separate products and systems**, which excel those developed in the aerospace industry. One official believes that aerospace manufacturers, by their fixation to work with many aerospace people, with resulting colossal limitations of ideas, should be able to do a better, lower-cost job.

• **Collective industry pressure** for the Defense Dept. to disallow aerospace companies' aerospace R&D activities as an item of expense in their aerospace contracts. That is suggested by one aerospace company official who feels that he feels his tax dollars are going to subsidize his own competition.

• **Organized companies** to recruit military and aerospace people with the know-how and equipment which exists in the established aerospace industry and which could be checked off if the present trend continues.

• **Go West . . .**—For Eastern and Midwestern firms, some aerospace believe that a partial answer to the problem is to set up West Coast subsidiaries. Object is to improve service and provide closer integration with a major segment of the aerospace industry, making it more attractive for these companies to buy their services rather than design and build it themselves.

Several firms, including RCA, Sylvania, Lockheed, Lear, Motorola and Collins Radio, have set up such West Coast operations. Specialists for two of these companies tell Aviation Week that they are convinced that this has appreciably strengthened their competitive position.

■ **M-H Goes South**—Mississippi Research is quite enthusiastic over the results of a small subsidiary operation in Dallas. This group, numbering around 25 engineers and designers, originally was set up to work with Chrysler's Wright in a variety of auto-flight controls for CVN's Republic missile. When this second source procurement was cut off, M-H decided to keep its Dallas group in business designing a new line of auto-flight controls for missiles.

An M-H spokesman says the com-



Dr. H.W. Anderson (left), director of Lockheed's Aerodynamics Research Center, is with two other members of a research team with Lockheed Research Laboratories (right) and Lockheed's Aerodynamics Research Center (center), and Anderson (right).

ST-11 Vertical-Rising Plane
In development; advanced version of current design (right)

ST-12 Vertical-Rising Plane
In development; advanced version of current design (right)

ST-13 Vertical-Rising Plane
In development; advanced version of current design (right)

ST-14 Vertical-Rising Plane
In development; advanced version of current design (right)

ST-15 Vertical-Rising Plane
In development; advanced version of current design (right)

ST-16 Vertical-Rising Plane
In development; advanced version of current design (right)



Six Prototypes Show Trend of Lockheed Aerodynamics Progress

Aerodynamics engineers work in a realm of classified activity.

Their accomplishments become known only when a plane first flies or is demonstrated—long after the Aerodynamics work is done.

That is why Lockheed's six prototypes are so significant to interested Aerodynamics Engineers.

Coming from hovering to supersonic flight, the prototypes individually are aerodynamics achievements. Collectively they demonstrate the versatility and scope of Lockheed's Aerodynamics staff.

They emphasize the creative atmosphere at Lockheed. For with Lockheed success is measured virtually every phase of aerodynamic endeavor, from thinking, new ideas are welcomed and rewarded. Moreover, the variety of the prototypes points out the path of Lockheed's Aerodynamics forces: significant advances in all phases of research, commercial and military.

AERODYNAMICS CAREER OPPORTUNITIES—This diversified expansion program has created new positions for Aerodynamics at all levels to create supersonic inlet design for flight at extremely high altitudes, make human pilots with rapid reactions of supersonic aircraft at low altitudes, develop boundary layer control systems for safe take-off and landing of fighters and transports, remove adverse reversal and tail fin problems associated in high speed flight through analysis and design, participate in determining configurations of two-engine and jet transport and advanced fighters, transporters and bombers.

Aerodynamics men interested in these problems are invited to write E. W. DeLozier, Dept. AW-4, for an application blank and brochure describing life and work at Lockheed.

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Avionics Companies Report Expansions

The world's first synthetic nose plant, being constructed in Caldwell, N. J., by a new subsidiary of Myson Corp. of New York, is one of several recently announced expansions and changes in the avionics industry.

The new Synthetic Nose Corp. plant is intended to reduce U. S. dependence on foreign sources for highly strategic items, which is widely used in aviation on tubes, capacitors, and other electrical devices. The new 150,000-sq. ft. plant, being built with private funds, is scheduled to begin production early this year.

Other avionics industry expansion: Motorola has opened a new 22,000-sq. ft. lab for guided missiles and guidance systems research and system analysis in Rome, Calif. New job is staffed by a nucleus of 40 scientists and engineers formerly employed by the National Bureau of Standards to monitor research and development staff is expected to grow to 200.

Harvard Corp., division of Avionics Instruments, Inc., will construction production plant and other avionics plant in a new Canadian plant recently opened in Toronto.

Kearfoot Co. is building a new 100,000-sq. ft. plant in Asheville, N. C. to manufacture machine and servo motor.

New facility is expected to be in production next spring.

Kaiser Instrument Corp. has produced company stock interest in the

Varian Corp. of Ann Arbor, L. I., N. Y., manufacturer of small electronic measuring pots. Varian will be operated in a subsidiary.

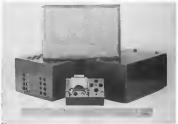
Boomer Co., Ltd. of San Francisco, and Teletron Industries Corp. of Long Island City, N. Y., have been elected to membership in the Radio Technical Committee for Avionics.

New Tube May Boost Civil DME Power

A new type of Union tube, especially several tubes now powerful than other tubes designed for use in distance measuring equipment ground stations, has been announced by Raytheon Co. The new 6X56 tube is capable of delivering 10 kw peak pulse power with only 100 mw. average power (57 db power gain) at frequencies of 900 to 1,400 mc. The tube has a 1-kw average power capability, permitting a 5% duty cycle at 28 in.

Developed for military use, probable for the new 70cm distance-bearing ground stations, it is hoped that the 6X56 may find use in civil DME ground stations, currently rated at 5 kw peak power. There has been some interest in boosting civil DME power in England by Air Navigation Development Board sponsored program to develop a 20 kw transmitter.

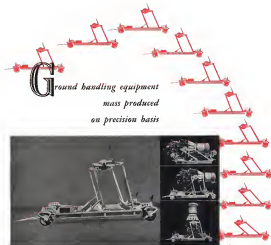
New Modulating Amplitude-Modulating design feature of the 6X56 is that its beam current can be varied by changing the voltage applied to a new modulator.



Copter Navaid?

Lightweight Decca Navigator may use one in helicopter navigation. Radio Division has obtained U. S. manufacturing and sales rights in the Dutch naval version Work No. 15, 1954, p.

15) It consists of light leg, center wheel, which gradually shows pilot his position, vertical bar, lower wheel, plus receiver and computer (B and C). Low altitude coverage at a Decca station.



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mass produced
on precision basis

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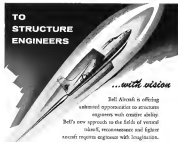
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ing needs, located between the tube's outside and draft tube section. This modulating mode permits the tube to be pulse or amplitude modulated from low-level driving signals with considerably higher overall tube efficiency.

For example, when operated as a modulated RF amplifier, the circuit can be 100% modulated with an efficiency of 10%. This is more than three times the efficiency possible with older klystrons not equipped with the modulating mode. Kline reports. The new device also makes a very efficient switch for pulse operation, company says.

Another advantage of the new klystron is that RF circuit elements are separate from the tube, permitting its replacement without disturbing the pulsed or modulating circuitry. Kline estimates the new X-10's operating life at 30,000 hours.

ENTER FILTER CENTER

► **Try New Interesting Game**—Probably the world's smallest integrating game, the HIG-1, measuring only 1 in. in diameter by 2 in. long, and weighing only 4½ oz., has been announced by General Mfg. Co., which is now in pilot production on the device. Tech. over details on the HIG-1 are given in a two-page ad elsewhere in this issue. Device is an outgrowth of a USAF sponsored development by MIT.

► **Wanted: Avionics Engineers**—Harold Hendry, Inc. of The New York Times claimed almost two full pages of display ads, working engineers and electronic engineers, usually the format. This is usually as much space as was devoted to all other "wants wanted" display ads, including approximately 3 pages for mechanical and peripheral engineers.

► **Radio Testing Made Easy**—Hillyer Instrument Co. has developed series of more than 20 electronic units which can be assembled into equipment capable of performing wide variety of tests on radio systems. For example, jitters equipment permits simulation of angle in multiple targets showing of tracking loops, evaluation of system response, checking of timing circuits. When IF amplifier characteristics affect system performance, input signal can be converted to RF frequency and injected into RF amplifier. Bellco No. 12 gives full details. Company address: 14 Lafayette St., New York 13, N. Y.

► **Sylvania Modules to Boston**—Sylvania Electric's Module Systems Lab., presently located at Wiscasset, Long Island, N. Y., will move to larger quarters in the Boston area and relocate.

—PK

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Powered by the Javelin's jet engines, it can outpace any other aircraft in the world.



of diplomatic ties parlay. The choice is that a well-known pilot's death. And, if you were the enemy, with all the ships down, a sneak attack on London would seem like a pretty good opening move. Defiant against this sneak attack is not an easy job. Certainly an early warning radar network in Europe is vital, but even single high-flying, high speed atomic bombers can wreak immediate destruction. And if, and when they fly, the prime defensive weapon is the Gloster Javelin. Here is an aircraft second to none in the world. It flies and fights at altitudes higher than ever before. It has a destructive power tough enough for any bomber, but the most important thing of all is that it carries in it the most complex search radar gear, a British invention, which is unparalleled in any other aircraft.

Fair weather or foul, night or day, the Javelin can track down and engage in combat any bomber. The Javelin carries a two-man crew—one to fly the airplane and the other to operate the complex radar gear. Very little can be said about the data-wing Javelin because security prevents it, but anyone knows it for what it is—the most important aircraft in Western Europe. It is powered by twin Armstrong Siddeley Sapphire and is made by Gloster, who made the first successful jet aircraft and comes from the Hawker Siddeley Group, makers also of the Hunter fighter and the Avro Vulcan four jet Delta bomber.

Gloster Javelin

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AIR TRANSPORT

ATA's Year-end Report on U. S.-Flag Airlines Says . . .

Everything Higher in '54 but the Profits

- Total revenues will be about \$359 million.
- But expenses will eat up some \$329 million.

Frank Shaw, Jr.

U. S. flag airlines, riding the crest of the aircraft mail passenger boom, continued to register substantial gains in 1954.

According to Air Transport Assn.'s year-end statistics, total traffic should hit the 579.7 million revenue ton miles mark for a jump of 11.5% over 1953, while total revenue will tally around \$359 million for a 6.4% increase. These figures compare favorably with gains expected for the domestic airlines (Aviation Week Dec. 6, p. 187).

All U. S. scheduled carriers, both international and domestic, will post approximately \$1.25 billion, a jump of about 5% over the previous year. They flew nearly 2.5 billion revenue ton miles of traffic for a gain of 15.8% over 1953, more than doubling the total revenue ton miles flown in 1949.

• **Charity Goes-Like their domestic brethren,** the U. S. international airlines continued to be plagued by a progressively narrowing profit margin. All gains since 1949 have been, in a sense, "for charity." The net income for 1954 will be the same, if not less, than that reported last for the year ago.

• **Mail revenues hit \$190 million,** as expected, down \$17.5 million of this will be offset off for expenses.

• **But, unlike the domestics,** the flag carriers are plagued by other equally weighty problems particularly peculiar to them. Chief among these:

- **Growing criticism of data increasing** discontinue as a subsidy.
- **Uncoordinated duplication** in many segments of this state structure.
- **Intense competition** from foreign flag airlines.
- **Subsidy Bill-Critics** of the subsidy program legitimately wonder why with domestic airlines practically off subsidy, the bill for the flag carrier goes to up to \$100 million a year. That is not an insubstantial sum considering that the industry has nearly doubled over a seven-year period, 1947-1954, while subsidy dependence makes a parallel increase.

U. S.-Flag Airlines Boxscore for '54*

TRAFFIC	1953	1954	Percentage change
Revenue passenger miles (RPM)	2,632,219	2,942,000	+ 11.8%
Revenue passenger miles (RPM)	3,514,314	3,708,000	+ 5.4%
U. S. mail ton miles	21,467,569	15,608,000	- 27.3%
Foreign mail ton miles	4,370,264	5,210,000	+ 19.1%
Cargo ton miles	744,445,000	82,518,000	+ 10.2%
Express baggage ton miles	8,291,270	1,970,000	- 9.1%
Nonsubsidized revenue ton miles	7,699,819	10,018,000	+ 29.1%
Total revenue ton miles	666,774,845	513,650,000	+ 41.51%
REVENUES AND EXPENSES			
Passenger revenue	251,596,000	253,305,000	+ 0.64%
U. S. mail revenue	83,741,800	96,573,800	+ 15.3%
Foreign mail revenue	9,940,000	9,400,000	- 5.3%
Cargo revenue	27,331,000	29,518,000	+ 8.0%
Express baggage revenue	3,241,000	5,730,000	+ 76.8%
Nonsubsidized revenue	3,540,000	4,900,000	+ 39.3%
Total revenues	\$37,256,000	\$37,709,000	+ 1.2%
Total expenses	\$37,807,000	\$39,000,000	+ 3.1%
* ATA year-end statistics			

They point questionably to the reported requirement of \$14 million in 1957 and \$44 million in 1974.

Many have noted that approximately three-fourths of this total subsidy for flag airlines is applied to support operations as seen throughout the world where commercial airlines are weak. In these areas, they wonder why they had not cut but two or three U. S. airlines flying the same transoceanic route when the traffic actually strayed by only one. This is a plan a number of foreign airlines flying the same routes.

Certain government officials, with the help of their constituents, are becoming increasingly aware that this economic duplication is costing, plainly-enough, more than the only really satisfactory picture, in their opinion, is in the North Atlantic, where the growing traffic adequately justifies the existence of several U. S. carriers flying parallel routes.

• **"Rational Tool"**—There is growing pressure for rapid implementation of the Air Coordinating Committee's report on air policy, based on the Administration's basic doctrine. For arriving at an established air transportation policy.

On subsidies, the report specifically

says "On the construction side they can be as crucial tool for stimulating the development of commercial aviation," but, "on the negative side, they can be a means for preserving an uneconomical structure within the industry. By shielding carriers from the full impact of market forces, they may weaken the normal business incentives for maximum economy and efficiency."

The report further holds that national interest factors require many international routes despite subsidy requirements. It emphasizes, however, that international route decisions should recognize the necessity of avoiding or eliminating uneconomical duplication of routes between U. S. carriers.

• **Monopoly Vs. Rivalry**—Critics of the ACC report say it fosters monopoly. Supporters counter with the argument that the subsidy benefits are not as much the monopoly carrier as present duplicating routes, but the taxpayer.

These supporters are fast becoming impatient, however. This question is asked frequently: "If the ACC report is to be the basis for our national air policy, will we not have some of its recommendations going to be implemented?"

So far, it is a most question. The

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AVIATION WEEK FEATURE ENGINEERING ARTICLE

"DC-7C CHALLENGES TURBINE TRANSPORTS"

This highly informative technical article is typical of the outstanding engineering reporting made available to AVIATION WEEK subscribers . . . by the largest and most highly skilled staff of graduate engineer-editors serving any aviation publication. In this case the story was written by David A. Anderson, Senior Engineering Editor, whose biography appears in this advertisement.

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DAVID A. ANDERSON, SENIOR EDITOR of the Engineering Editor, is a graduate of the University of Michigan, School of Engineering, and has completed advanced postgraduate studies at Princeton University and the University of California. He has published numerous papers in the field of aircraft design and engineering. He is a member of the American Institute of Aeronautics and Astronautics, the Society of Automotive Engineers, the American Society of Mechanical Engineers, and the American Society of Civil Engineers. He is also a member of the National Aeronautics Association and the National Society of Professional Engineers.

Mr. Anderson is the author of the book "The Design of the DC-7C" published by McGraw-Hill. He is also the author of the book "The Design of the DC-7C" published by McGraw-Hill. He is also the author of the book "The Design of the DC-7C" published by McGraw-Hill.



Mr. Anderson is a member of the Institute of the Aeronautical Sciences, Society of Automotive Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers, and the National Society of Professional Engineers.



The American World Airways airplane designed by Douglas

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CAB ORDERS

(Dec. 16/22)

GRANTED: Quick Airlines' petition to discontinue service at various airports on or about Jan. 1, subject to any necessary amendment of Civil Air Regulations concerning such service. Los Angeles Chapter of Consumers here is interested in the Contra Costa City/Los Angeles route.

Transportation Act: Lanes in exemption to operate over Light Airline, Germany, to Seattle.

Islet Flying Service: an exemption to air play flight in an Alaska pilot's report, subject to certain conditions, and final decision to the investigation of other Alaska air services.

City of Honolulu, S. D., leave to intervene in a case involving maintenance of Western Air Lines' facilities for Route 15.

AFFIRMED:

Interagency agreements: involving Trans World Airlines and Eastern Airlines, Midland Airlines and E. W. Wiggins Airways and various other carriers.

At Cargo Express: and Air Cargo Co. maintain interlocking relationships involving Harry I. Pacific, subject to certain conditions.

Western Transportation Co., deny loss of W. T. C. Air Service and Southwest Western Co.'s interlocking relationships involving A. Meyer and R. Meyer, subject to certain conditions.

Continental Forwarding Service and Public Express Service's interlocking relationships involving Paul P. Heston, subject to certain conditions.

AUTHORIZED:

Trans-Canada Air Lines has filed at Kansas Airport, Mo., extended to June 30, 1953, and to permit to operate between Mexico City and Tampa, Fla., extended to Sept. 30, 1953.

Continental Airlines members of Inter national Air Transport Association and the CAB still on proposed agreements relating to carriage and related traffic regulations.

AMENDED:

Bozell Airways' certificate for Routes 1 and 15 suspending service at Digby, Mo. and Muskogee, Okla., while Central Airlines serves those points.

Los Angeles Airlines' exemption authorizing service to California Expressway Ferry Term, Ohio, is withdrawn Dec. 11, 1952.

DENIED:

Lake Central Airlines, Capital Airlines and Northwest Airlines' applications to permit extra flights during the American Airlines pilot strike, since AAV service has been resumed.

ORDERED:

National Airlines' proposed stopping flight of two and changing the language be suspended until Aug. 1, 1953, and as a condition applied to the matter.

Central Airlines in show case why proposed temporary mail route should not be pending filing of final rates.

Northwest Airlines' temporary mail route in the city proposed by the CAB.

Alaska Airlines' temporary mail route in the city proposed by the CAB.

Trans-Canada Airlines' mail route filed in the city proposed by the CAB.

CAB Reopens Three International Rates

Final mail rates for Latin American service were reopened last week by Civil Aeronautics Board.

The above includes Pan American World Airways' Latin American Division and both Latin American and domestic operations of Braniff Airways.

Rate Reductions: Show cause orders were issued suspending temporarily rates that would reduce and pay for Pacific and the Latin American operations at Braniff.

The orders were made because of excess earnings reported by both airlines for the year ended Oct. 31, 1952.

PAA's Latin American Division did not receive a rate cut, but the rate was suspended to determine whether it will become excessive in the future year.

The Board points to higher fuel and labor and operating expenses "reasonably to be anticipated" as an operation of the rate of the division.

Earnings: Braniff-Panama's rate was suspended because earnings appear to exceed "the current rate may result in an undue burden on the given service unless suspended at this time."

Earnings reported a profit after taxes for the year ended Oct. 31, 1952, of \$1,022,000, a return of 12.75% on investment.

The mail rate is designed to give a return of 10% at \$172,000 a year—the new temporary rate effective Jan. 1, 1953, will pay \$2,290,000 annually.

Braniff also reported excess earnings for the same period. Total after taxes was \$259,000 or a 14.14% return as compared to administrative operations.

Braniff's rate is designed to yield a return of 10% as Latin American operations and 8% on domestic.

No current income earnings have been found in the domestic operations, but the rates have been suspended in view of excess earnings factors to determine whether they might become excessive in the future.

Rate Requirements: All three carriers must file with the Board a forecast of traffic and financial results for affected divisions for the year beginning Jan. 1, 1953.

Comments are to include a statement of mail pay requirements and rates the carriers believe reasonable. They must be filed in 30 days.

CAB Blames Storm For Braniff Crash

A Braniff Airways DG-5 crash last August probably was caused by very heavy rain, divergent winds and strong downdrafts of a thunderstorm, Civil Aeronautics Board reports.

The transport crashed near Miami City, Iowa, Aug. 22 while operating on VFR on a Memphis-Minneapolis flight. Twelve persons were killed and seven seriously injured. The DG-5 was destroyed.

In its report, CAB says the forecast issued by the Weather Bureau and Braniff did not indicate the severity of the storm in the DG-5's path.

Investigation found evidence of strong downdrafts in the storm. Damage to the aircraft indicated it hit the ground with considerable downward velocity and low forward speed.

SHORTLINES

British Overseas Airways Corp. will increase passenger seat capacity 17% in 1953. Boeing Stratocruiser will be used exclusively in Britain and around service across the Atlantic.

Capital Airlines has signed a three-year contract with Shell Oil Co. to supply kerosene for the carrier's 64 Western Viscountes as well as placed as the first repair order in the U.S. for turboprop fuel.

KLM Royal Dutch Airlines is offering two types of trans-Atlantic service—direct and around. The new direct service, which employs first-class, offers sleeping lounge chairs service at no extra cost.

Luckland Airways Services: Braniff is investigating carriers in Spanish to aid relations with Iberia, American and L.A.V.

Seaboard & Western Airlines logged 498,514 revenue miles across the North Atlantic during October. The two carriers also made 5,579 flights coming since May 1947.

United Air Lines set a company record Dec. 15 doing 102,886 mail and cargo ton-miles. United's first two 1953 more corporate mail profitable this year than it had last Christmas season.

Panoramic Air Lines carried 14,348 passengers 3,718,127 revenue passenger-miles in November with a load factor of 49.17%. Passenger traffic increased 36% over November 1951.



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Aid for Flight Safety

Lance S. Rockefeller has contributed another gift to the Flight Safety Foundation, approximately \$20,000. This brings Mr. Rockefeller's aid to the foundation to just under \$100,000 since 1982.

This is a valuable contribution to a vital cause. It is another concrete demonstration of faith in this non-profit organization. It also is a distinct public service by Mr. Rockefeller.

In announcing his decision to contribute again to the foundation, Mr. Rockefeller wrote (in part), Admiral John Towers, "Under the past stewardship of Jerry Lodewyck and yourself, the Flight Safety Foundation has in my opinion during the past year continued to warrant the confidence of its many supporters. I am hopeful that as time goes on a larger segment of the aircraft manufacturing industry will come to recognize more fully the contribution that you are making, and that you will thereby gain the broader recognition and support the foundation so clearly deserves. I shall continue to follow with interest the valuable work that you are doing."

The foundation was established in 1965 to anticipate flight safety problems, study flight safety procedures, and disseminate flight safety information, all of which it has accomplished with increasing skill and judgment. It directs its efforts to all levels of flying, from assignment to mechanics.

A new brochure on the foundation significantly titled "168,000,000 Americans Have a Stake in Flight Safety," cites a few of the important problems studied, interpreted and reported to industry.

Cockpit complacency. The sustained effort to combat complacency—the "It won't happen to me" attitude—has actually advanced aviation safety to beginning. This attitude to combat complacency is a continuing objective. **Smaller Bladder Per years "optical illusions"** troubled pilots. Now for the first time in aviation history, the facts have been associated and disseminated.

Mechanics' creed. Aviation long recognized the need to improve the professional status of mechanics. The foundation sets forth a code of professional conduct for them.

Crew relationships. Tensions toward personal animosity which may create difficult and even hazardous conditions in the cockpit have for years been a "hidden factor" in flight operations. The foundation offers the opportunity to exchange experiences among pilots and crew members without fear of any positive action being taken.

Interchange of experience. The waste and danger of accidents that "repeat themselves" have long plagued aviation. Now with assurance of anonymity from the foundation, pilots and mechanics willingly report information on non-accidents that will help avert the real thing.

Refueling hazards. These have been decreased by flight safety bulletins.

Ditching procedures. Through specific flight safety bulletins, the Merchant Marine now has access to full information.

Mental hazards. Problems such as panic on the part of passengers have been studied by the aviation industry and the Air Force for many years, but it required flight safety studies to make the hazards readily understandable to the flight crew.

Medical standards. Medical and physical standards promote safety. The foundation has encouraged tests for color blindness for reducing crew because each of different vision ratings have different colors.

Another indication of the growing acceptance of the foundation is the list of more than 70 organizations—usually a who's who of aviation—that send representatives to its most recent annual three-day sessions, in November.

The airline participants were American, Colonial, Continental, Eastern, KLM, Pan American, Gulf, Pan American, Scandinavian, Trans Canada, TWA World, Transocean and United.

Aircraft manufacturing participants were Bell, Boeing, Cessna, Chance Vought, Convair, Douglas, Fairchild, Grumman, Lockheed, Martin, McDonnell, North American, Northrop, Republic, Ryan and T-6.

Other firms included Air Charters, General Motors, Lear, Raytheon, Sylvania and U S Steel.

Associations and government bureaus were representative: ALPA, British gov't, RCAF, Coast Guard, Navy, ATA, Flight Engineers, CAA, CAB, NACA, Port of New York Authority, IAS, Lovelace Foundation, University of California, University of Southern California, Harvard School of Public Health, Crash Injury Research, Carroll Corporation, Aviation Safety Center and 14 USAF commands.

This is signal recognition of Flight Safety Foundation. It is to be hoped that all of these groups who benefited—and many more—will make provisions for its financial aid before the new year gets any older. Mr. Rockefeller has set the example again.

John Stapp's Contribution

These courageous experiments of Lt. Col. John P. Stapp under almost immediate rates of acceleration and deceleration won the admiration and appreciation of the aviation world.

The ground press is interested in the colonel's achievement in breaking his old "land speed record" of 421 mph and setting a new one of 612 mph, in the Northrop-built rocket-propelled sled at Holloman Air Development Center. But the medical and aerospace significance is that Col. Stapp is furnishing valuable information on body stresses and reactions which probably will save the lives of pilots in aircraft subjected to sudden loads or of those who must abandon aircraft at high speeds.

It was revealed officially that the wind blast Col. Stapp encountered on the latest run was equivalent to that hitting a man ejected from a plane flying at more than a thousand miles an hour at 35,000 ft. altitude.

Col. Stapp recently won an award from Flight Safety Foundation for his outstanding contribution to aviation. The award was richly deserved.

—Robert H. Wood

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Imagination replaces runway in Convair vertical takeoff fighter

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